DOCUMENT RESUME

ED 371 748 IR 055 068

AUTHOR	Braden, Roberts A., Ed.; And Others
TITLE	Visual Literacy in Life and Learning: Readings from the Annual Conference of the International Visual Literacy Association (19th, Tulsa, Oklahoma, October 28-November 1, 1987).
INSTITUTION	International Visual Literacy Association.
REPORT NO	ISBN-0-945829-02-7
PUB DATE	88
NOTE	426p.; For the proceedings of the 18th conference, see ED 352 931.
PUB TYPE	Collected Works - Conference Proceedings (021)
EDRS PRICE	MF01/PC18 Plus Postage.
DESCRIPTORS	Cable Television; Computer Assisted Instruction; Curriculum Development; Desktop Publishing; Educational Assessment; Educational Media; Educational Research; *Educational Technology; Elementary Secondary Education; Ethics; Higher Education; Hypermedia; Imagery; Instructional Design; Interactive Video; *Photography; Reading Skills; Thinking Skills; *Visual Learning; *Visual Literacy

ABSTRACT

This volume contains 47 papers presented under the following four major categories: (1) "Visual Literacy and Education," including curriculum development, teaching visual literacy, thinking skills and visual literacy, teaching video production techniques, teacher education, cable television in public schools, using filmstrips in the classroom to develop comprehensive skills, alternative school assessment methods, visual literacy and the language arts, visual presentation and gender, interactive videodiscs, and computer assisted instruction and language arts (15 papers); (2) "Visual Literacy and Technology," including television technology, wayfinding and online public access catalogs, young publishers, desktop publishing, role of the electronic media, electronic texts, and scriptwriting (11 papers); (3) "Visual Literacy and Research and Theory," including investigation of narrative television technology, Einstein's perceptual theory in films; interpretation of image content, learning styles, cognitive style and contextual backgrounds, developmental techniques and the affective domain, hypertext, visual intelligence training, and television courses (10 papers); and (4) "Visual Literacy and Art, Aesthetics and Values," including art as instrument of vision, visual literacy for the non-artist, image creation, computer generated graphics, photography, ethics and visual literacy, and visual values (11 papers). Most of the papers contain references. (JLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 371 748

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it
☐ Minor changes have been made to improve reproduction quality
● Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

Visual Literacy

IN LIFE AND LEARNING

BRADEN,
BEAUCHAMP
&
MILLER
Editors

IR055068

BEST COPY AVAILABLE

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Alice D. Walker
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Visual Literacy

IN LIFE AND LEARNING

READINGS FROM
THE 19TH ANNUAL CONFERENCE
of the
INTERNATIONAL
VISUAL LITERACY ASSOCIATION

Edited by
Roberts A. Braden
Beverly Braden
Darrell G. Beauchamp
and Laverne Miller

Published at Virginia Tech University
Blacksburg, Virginia 1988

ACKNOWLEDGMENTS

The editors wish to acknowledge the assistance and cooperation of more than five dozen individuals who contributed to the production of this book. First, there are the 59 authors and co-authors -- not including the members of Ron Gautreau's class (the et al of his by-line). Then there were Barbara Duffy and Jim Sucy who helped R.A.B. referee the IVLA proposals that led to the presentations which, in turn, led to this collection of papers. Because IVLA publishes its annual book of readings on a very lean budget, special thanks is due to the 80% of the authors who made some or all of the suggested editorial changes and provided us with camera-ready copy. Those individuals were particularly tolerant, considering that each original manuscript contained the editorial scratchings of three different editors. We are also indebted to the staff of the Center for Educational Media and Technology at East Texas State University whose many small favors sped the completion of the task. In particular, we want to thank Ms. Una Harris and Ms. Marcille Tucker for their typing assistance, and Joe Magera who volunteered hour upon hour of his time to help with whatever needed to be done at a given moment. Finally, we must give applause and gratitude to Alice Walker who bailed us out when our Texas publisher doubled his price for printing the book. Alice not only negotiated a suitable printing arrangement, she became the "middle-person" who handled IVLA's interests with the printing plant at Virginia Tech.

ISBN 0-945829-02-7

Copyright © 1988. International Visual Literacy Association, Inc.
c/o Educational Technologies, Blacksburg, VA 24061

TABLE OF CONTENTS

Section I

Foundations for a Visual Perceptual Development Curriculum
Tillman J. Ragan 1

Video -- Friend or Foe? or How to Teach the Reading of Seeing
Barbara A. Dobbs 12

Teaching Visual Literacy to Teachers
Robert Muffoletto 17

How I Teach Visual Literacy in My Basic Educational Media Classes
Earle E. Williams 26

Thinking Skills and Visual Literacy
Lyn Lacy 33

VCR Visual Techniques for Fifth and Sixth Graders -- More Than Turning It On!
Beth Saxton 41

Beyond the Three R's: A Cooperative Venture
Bruce A. Petty and Carl David Payne 47

Dynamite Approaches to Visual Literacy: What's Happening in Pittsburgh
Barbara Seels 50

Cable Television -- Public Schools -- Visual Literacy
Lesley Johnson 63

Using Filmstrips in the Classroom to Develop Comprehension Skills
Inez L. Ramsey 76

Toward an Alternative Perception of the Practice of Schooling: Beyond Mere Effectiveness
J. Randall Koetting 80

A Reality: Visual Literacy's Connection to Literacy in the Language Arts
Janice J. Wilson 98

See Jane, See Jane Compute?: Perceived Credibility of Adolescent Female Talent in Visual Presentations on Computer Use
Landra L. Rezabek 105

Sparking Learning in Middle Schools with Interactive Videodiscs
Lisa Novemsky, Howard Kimmel and Mark O'Shea 121

Use of Graphics to Conceptualize Meaning in Language Arts CAI
Richard Sinatra 125

Section II

Videodisc Visuals for Learning Physics
Ronald Gautreau, et al. 135

Interactive Video in the Classroom
Merton E. Thompson. 139

Computerized Television: Technology Overshadows Aesthetics
Nikos Metallinos. 143

Wayfinding in Computerized Card Catalogs: Library of Congress VS. Gallaudet University
Sandra Wright Sutherland. 156

Young Publishers
Margaret Barrows and Pamela Workman. 175

Visual Aspects of Desktop Publishing: YGWYS, not WYSIWYG
Roberts A. Braden. 177

Desktop Publishing: Merging Literacies
Priscilla Hardin. 181

Desktop Publishing Update -- A Presentation of the Latest Equipment and Programs for Using Personal Computers to "Publish It Yourself"
Earlese M.J. Bruno. 185

Video Technology and Moral Development: The Role of Electronic Media
Dennis Adams and Mary Hamm. 190

Research on Electronic Text
Andrew R. J. Yeaman. 197

A Model for a Scriptwriting Workshop
Barbara Roos. 208

Section III

An Investigation of Narrative Television Comprehension: Factors of Visual Literacy
Rhonda S. Robinson 215

Turning Visual Image into Thought Process: Eisenstein's Perceptual Theory as the Basis of Montage Methodology in Film
Ann Marie Seward Barry. 224

Interpretation of Image Content
Rune Pettersson. 233

A Comparison of Learning Styles of Academic and Vocational Male and Female Students
Beverlee Kissick and Don H. Grob. 247

The Effects of Presentation Order and Contextual Background on Cognitive Style
David M. Moore 257

Learning Styles and Visual Literacy: Connections and Actions
J. Robert Hanson, Harvey F. Silver, and Richard W. Strong 270

Developmental Techniques to Promote Research and Learning with Visuals in the Affective Domain
Darrell Beauchamp 299

Hypertext and Elaboration Theory: Use of Visual Epitomes for Learning Complex, Multi-Topic Material
Randall H. Rezabek and Tillman J. Ragan 302

An Agenda for Conducting Research on Visual Intelligence Training
Ronald J. Aust and Robert G. Harrington 311

Identifying the Telecourse Student: Who She Is and What She Wants
LaVerne W. Miller 323

Section IV

The Arts - An Instrument of Vision
Grant Venerable 331

An Artist's View of Visual Literacy for the Non-Artist
Deborah Curtiss 337

Creating and Image
Freda Flatt 348

Computer Generated Graphics in Business, Education, and Medicine
Robert E. Griffin, Mary F. Whiteside, and J. Alan Whiteside 351

Microcomputer Graphics: The Production of 35mm Slides and Transparencies for Teaching and Research Presentations
J. Thomas Head 361

Nurturing Photographic Creativity While Maintaining Individuality
Deborah L. Raymond 368

The Photograph: An Icon of Violence or Peace?
Martin Oudejans 374

Architectural Photographs Promote Student Awareness and Aesthetic Appreciation
Joyce Phillips 384

Turkey: Conflicting Values, Contrasting Images
Marina Stock McIsaac 394

Ethical Considerations in Visual Literacy
Val E. Limburg 396

Visual Value
Richard W. Lind 403

SECTION I

VISUAL LITERACY AND EDUCATION

Foundations for a Visual Perceptual Development Curriculum

Tillman J. Ragan

Introduction

There appears to be a clear relationship, across a number of cognitive style dimensions, between high academic performance on the one hand and style characteristics, on the other hand, that are associated with high ability as measured by essentially visual perceptual tasks. In other words, people who are field independent tend to do better in school than people who are field dependent (Arbuthnot and Gruenfeld, 1969; Witkin, et. al., 1977); people who are reflective tend to do better in school work than those who are impulsive (Asuburn, Back, and Hoover, 1976; Kagan, 1965; Kagan, 1966); and people who are visual tend to do better in school work than those who are haptic (Bruning, 1974; Erickson, 1969; Templeman, 1962).

This is only a sample of a consistent trend of findings. These style dimensions are theoretically diverse but they do have one thing in common: they all use visual perceptual tasks in their testing instrumentation and the "style" which predicts academic success is the one associated with good performance on the visual tasks presented. In addition, there is good reason to believe that these measures are independent of general ability. Although there is a positive correlation between most intelligence measures and the advantaged side of these style measures, when the "performance" scores from the I.Q. tests are not counted (performance scores being the product of visual task performance), the correlation disappears.

An Overview of Cognitive Style Dimensions

Cognitive styles generally reflect differences in the manner in which individuals receive, process and use information. Collectively, cognitive styles are psychological dimensions which are said to represent consistencies in an individual's manner of acquiring and processing information. Following are brief descriptions of ten dimensions of cognitive style about which it appears that we at least know enough to assert that such a style factor exists.

1. **Field independence-dependence:** an analytic as opposed to global manner of perceiving. Field independence reflects the ability to perceive visual stimuli as separate from an embedded context.

2. **Impulsivity-reflectivity:** individual differences in speed and errors when making responses. Reflective persons take longer to respond and are usually

correct upon choosing a response. Impulsive individuals tend to select the first response that occurs to them and are usually incorrect.

3. **Visual-haptic:** the visual perceptual type is said to use his or her eyes as the primary sensory intermediaries while the haptic is said to use his or her eyes only when necessary and to rely mainly upon kinesthetic and body orientation.

4. **Leveling-sharpening:** individual differences in assimilation. Levelers tend to incorporate new ideas with old memories and blur the original image. Sharpeners add new ideas as well as holding onto the original image.

5. **Constricted-flexible control:** individual differences in susceptibility to distraction.

6. **Breadth of categorization:** an individual's preference for broad versus narrow categorization.

7. **Scanning:** an individual difference reflected in extensiveness and intensity of attention.

8. **Tolerance for unrealistic experiences:** individual differences in willingness to accept perceptions which are at variance with normal experiences.

9. **Cognitive complexity/simplicity:** differences in individuals' tendency to see the world in a multi-dimensional and discriminating manner.

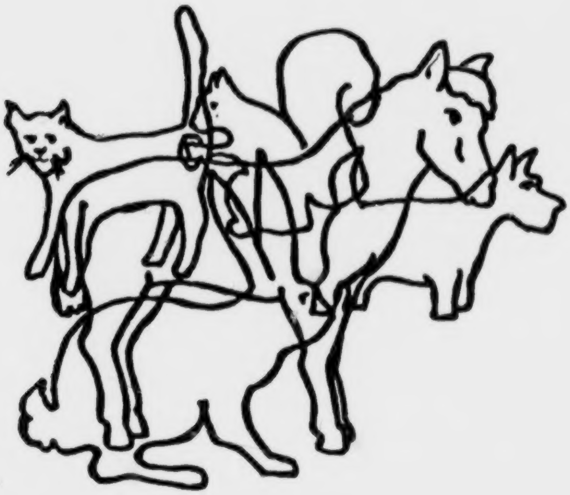
10. **Conceptualizing styles:** individual differences in categorization of stimuli with perceived similarities or differences; use of consistent conceptualization; approaches in concept formation.

Ragan, et. al. (1979, p. 1-2)

A large number of individual researchers and teams of researchers, employing a variety of theoretical approaches, have worked on the development of these various dimensions through empirical studies and theory development. There are many other descriptions of learner difference, often called "cognitive styles" or "educational cognitive styles" and sometimes called "learning styles." It is possible that some of them have validity. However, from experience in directing a three-year funded research project in cognitive styles, I would recommend a cautious and prudent approach to the area. A large number of popular and appealing style formulations along with prescriptions for educational application have been developed and are widely touted by individuals on the "lecture circuit" as well as by adopting practitioners. I would primarily recommend looking for empirical evidence that the styles described by a given formulation do indeed exist. In many cases, the data which is available points to a conclusion that although the styles discussed may be interesting to think about, they do not exist as phenomena in the outside world.

At this point, I want to present some example items from some of the cognitive style test instruments listed above. The reader is encouraged to take particular note, in the examples to follow, of what visual-perceptual tasks the test requires the subject to perform. To put the first cognitive style example into perspective, it might be well to study a frame from the Santa Clara Inventory of Developmental Tasks, developed by Richard Zweig and associates (Gainer, 1974).

Figure 1

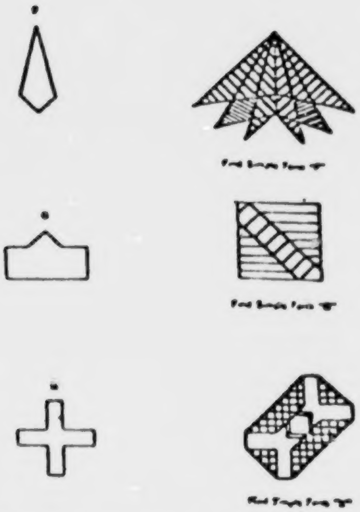


From: Gainer, William L., Ed., *Santa Clara Inventory of Developmental Tasks*. Santa Clara, Calif.: Santa Clara Unified School District and Richard L. Zweig Associates, 1974, p. 53.

In this preschool instrument for reading readiness assessment, the child is given a drawing in which five animal outlines are superimposed. The child is asked to trace the outline of one particular animal, for example, the rabbit. The task appears to be a special case of discrimination, that of disembedding a figure (or part of it) from an embedded context.

Now note a figure from the Group Embedded Figures Test, or GEFT (Witkin, 1971). The task here, as in the Santa Clara Inventory, is to find a form embedded within a distracting context. In the case of the GEFT, the figures are non-meaningful geometric shapes. The task is also made more difficult by the fact that the person taking the test never sees both figures at the same time. He/she is required to flip the test booklet to the back page to look at the simple form, then return to another page to the complex figure containing the simple form, and to trace the embedded simple form, using a pencil.

Figure 2

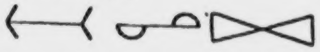


"Reproduced by special permission of the Publisher, Consulting Psychologists Press, Inc., Palo Alto CA 94306,
from The Group Embedded Figures Test
by Oltman, Raskin, Witkin © 1971
Further reproduction is prohibited without the Publisher's consent."

In another sample item from Zweig's Santa Clara Inventory, a figure is shown for five seconds. When the figure is removed, the student is asked to draw the figure. A total of three figures are presented to be drawn from memory.

Figure 3

Material: Three response cards



Procedure: Say, "I'm going to show you a card with a design on it. After I turn the card over, you draw one just like the one on the card." Show child the card for five seconds.

Scoring:

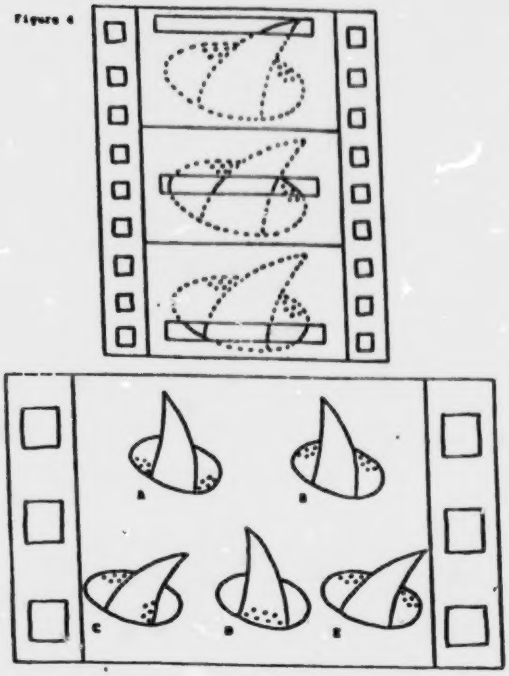
0	1	2
Child cannot reproduce two or more designs	Child cannot reproduce one design	Child can reproduce the three forms accurately

From: Gelmer, William L., Ed., Santa Clara Inventory of Developmental Tasks. Santa Clara, Calif.: Santa Clara Unified School District and Richard L. Zweig Associates, 1974, p. 63.

Similar to the figure memory test is the Successive Perception Test-1 or SPT-1, an instrument developed in the 1940's to measure visual-haptic perceptual style (Lowenfeld, 1945). The SPT-1 is in the form of a motion picture film. It presents abstract figures which are viewed through a mask which allows only a small section of the figure to be seen at one time. To select from the alternative figures presented, the test subject must visualize one whole figure and remember it long enough to mentally compare it with the alternatives.

BEST COPY AVAILABLE

Figure 4



Example Item (Illustration) from Successive Perception Test - 1, U.S. Army Air Corps.

Just as the demands of the embedded animals from the Santa Clara Inventory are similar to the demands of the GEFT, the figure memory items from the Inventory present a related task to the visual integration and memory requirements which the SPT-1 presents at a higher level of difficulty.

Other tests of cognitive style can be briefly described here to further illustrate the variety of visual tasks employed. In Kagan's Matching Familiar Figures test, or MFF (Kagan, 1969), the individual is shown a line drawing of a familiar figure, such as a person or ship, on one page, and on a simultaneously displayed second page, six drawings which appear at first glance to be identical to the model drawing. The subject's task is to find and select which one of the six drawings is an exact match to the model. The other five drawings vary from the model in small details missing, added, or distorted. Those individuals who are both slow and accurate with this task are considered "reflective," and those who are fast and inaccurate are considered "impulsive."

The Color-Word, or Stroop Test, a measure of distractibility, (Gardner, et. al., 1959), requires the subject to read names of colors rapidly, to name blocks of colors rapidly, then quickly read names of colors which are printed in contradictory combinations. The test is a sort of visual tongue-twister, with more distractible individuals making more errors in reading the miscolored words than do less distractible individuals.

The Leveling Sharpening House Test, or LSHT, is an adult measure of leveling-sharpening, and the Leveling Sharpening Wagon Test (LSWT) is a measure of the same cognitive control designed for children (Santostephano, 1964). Approximately sixty pages of a line drawing are sequentially displayed to the viewer. In the house test version, parts of the drawing are gradually omitted in otherwise identical drawings of a house. The first few omissions are extremely subtle. The individual who detects the changes in the drawing relatively early is considered a "sharpener," and those who fail to detect the differences until they become relatively obvious are considered "levelers."

Visual Literacy and Cognitive Styles

The Group Embedded Figures Test seems to provide an advanced version of much the same task as the embedded animals item from the Santa Clara Inventory reading readiness test. One should note that there are highly developed systems of instructional materials and teaching methodologies for reading readiness and related areas in widespread use. These systems, developed by Frostig, Montessori, Zweig, and others, share a perceptual development emphasis. Given the effort expended at perceptual development in early years, it is too bad that we do not find equivalent efforts in schools being directed at development of advanced skills. For older children and adults, very little visual-spatial perceptual development work is done in schools. Once children learn to read, work on development of visual-spatial skills is suddenly stopped.

What is being accomplished in the visual-spatial development area can be observed in concomitant outcomes from elective classes in art, mechanical drawing, and industrial arts, and in a few schools, something they call "visual literacy," but there has been little beyond this. Even visual literacy programs do not generally attempt student achievement of perceptual development learnings directly; accomplishment of such learnings is typically a side effect of work directed at achievement of other objectives.

The constructs behind the cognitive and perceptual style instruments discussed are very much at odds with the fundamental educational optimism behind much of the visual literacy movement. Researchers in cognitive styles are coming from an "individual difference" frame of reference. In most cases, they are concerned with individual edifferences which have been demonstrated to be highly resistant to change by instruction. The present concern, however, is not the question of changing cognitive styles but to point out some areas of visual "skill" which are illustrated by tasks in cognitive style tests. I am hypothesizing that these visual skills can be learned. Such learning might best be fostered by appropriate work in visual literacy.

Many of the differences between people which are currently attributed to cognitive style may be merely aptitude differences, not ceilings on capability. As previously noted, there is little work in schools that is directed at the development of advanced visual perceptual skills. Having achieved "reading readiness," it would appear that schools move on to development of cognitive skills in subjects such as writing and mathematics, as well as skills in reading itself. Visual/perceptual skills may be as open to learning as is reading.

Intellectual development, as a product of school learning, is a persistent outcome of schooling and is the generalized cumulative effect of those skills which schools concentrate on. Some efforts at visual/perceptual development appear to be successful at the preschool level (Spache, 1976, p. 380-432). It may be, however, that after preschool and first gade, schools stop doing a good thing.

There is a question as to whether the justification exists for a parity of effort between the more or less traditional and established outcomes of language, mathematics, and science and the outcomes of increased visual-spatial skills training. In the section to follow, I would like to address that question.

A Rationale for a Perceptual Development Curriculum

Although the term "cognitive style" seems to be the one that is most commonplace in the literature, a number of the cognitive style dimensions were originally conceived of as perceptual styles or were derived from investigations in the area of perception, not cognition. Lowenfeld referred to perceptual types specifically in labeling his typology. Witkin's field independence-dependence is perhaps the most widely studied and frequently referenced style and is responsible for the term "cognitive style." Yet, the study of field independence-dependence began with questions from the study of perception--specifically, questions of perception of the upright.

The development of questions in perception having led to something called "cognitive style," along with the visual-perceptual nature of the instruments used to measure them, brings Arnheim's Visual Thinking to mind (Arnheim, 1969). A fundamental point of Arnheim's is that visual perception, far from being "mere perception" as it has long been considered, includes the same behaviors that we commonly consider only as matters of cognition or thinking. In Visual Thinking Arnheim develops the idea of the "percept." Percepts are building blocks of visual thinking and as such are perceptually based analogies to the cognitive function of concepts.

A year after Arnheim asked for "the systematic training of visual sensitivity" (1969, p. 315), Moore's taxonomy of perception was published (1970). Employing this taxonomy, one may place the variety of visual tasks employed in cognitive style tests into a meaningful context of educational development goals. Such goals would be fundamentally related to the development of visual perceptual skills, and also highly related to cognitive skills and strategies.

A major question remains as to whether instruction leading to perceptual development of the sort reflected in the style dimensions discussed earlier is feasible. And, assuming effective instruction, it is also problematic as to whether the transfer of learning which would be involved to apply the learnings to everyday life is possible. Although this area is little studied, a recent paper by Aust and Harrington (1987) takes the potentials of trainability of perceptual skills farther than anything else I have been able to find. Aust and Harrington have developed pilot instructional sequences for mental imagery training, the goals of which are far more ambitious than one might anticipate, involving such tasks as imagery of embedded solids (such as a cube embedded in a sphere and a pyramid embedded within the cube) passing through a plane, in which the imagery demand is that of visualization of what one would see at the level of the plane.

The Foundation for a Perceptual Development Curriculum: A Taxonomy of Visual Literacy Outcomes

The following is adapted from a taxonomy which I developed ten years ago and presented in a paper on relationships between visual literacy interests and the new (at that time) knowledge about brain functioning from hemispheric lateralization studies (Ragan, 1977b).

The taxonomy presents example capabilities at three levels: primary, skilled, and advanced. For each level, activities and outcomes are presented which exemplify skill development in three domains: manipulation, construction, and abstraction. For both levels and domains, the taxonomy is illustrative rather than comprehensive. In other words, it is highly likely that more than three levels can be productively discussed, and it is as well highly likely that other important domains exist beyond manipulation, construction, and abstraction. For example, the domain of "communication" was added in an extension of the original taxonomy (Olia and Ragan, 1980). Finally, there is no suggestion of comprehensiveness in the activities and outcomes which are described within each level and domain. An important area for future work in visual literacy curriculum development lies in adding to the activities and outcomes to produce a relatively comprehensive and complete compilation of critical visual literacy outcomes.

A Taxonomy of Visual Literacy Outcomes:

A. **Primary Level:** (preschool through first grade, approximately)

1. **Manipulation:**
   *Holding, touching, and changing objects in the environment, both commonplace and unusual.

2. **Construction:**
   *drawings, paintings, making simple constructions such as cardboard cut-outs and cut and paste creations.
   *operating a simple camera to take pictures.

3. **Abstractions:**
   *identification and learning of defined physical concepts such as "triangle-ness", "long," "short," and so forth.

B. **Skilled Level:** (second through sixth grade, approximately)

1. **Manipulation:**
   *tool using in complex, concrete visual-spatial problems, such as in mechanical constructions (Lego, Erector, etc.), sewing (with and without pattern use), and repairs (such as taking a clock apart and putting it back together).
   *Sequencing and describing one's photographs.

2. **Construction:**
   *drawing with perspective from objects present.
   *controlling variables in taking pictures to produce a desired result.
   *controlling visual variables in photographic processing.
   *origami and related complex constructions.

3. **Abstractions:**
*creation of visual plan/patterns in two dimensions.

*specifying photographic treatment for physical objects, actions, and sequences.

C. **Advanced Level:** (sixth grade - approximately - and beyond)

1. **Manipulation:**
   *ability to mentally manipulate complex and multiple visual fields and representations, as in work with topology and visualization of multivariate statistical models.

2. **Construction:**
   *ability to draw imagined objects in three dimensions, idea sketching, production of original conceptualizations of high visual complexity and ingenuity.
   *possession of one's own original photographic style.

3. **Abstractions:**
   *multiple holistic appositional forms of abstract visual thought; lateral thinking; visual intuition; unique visual invention.

A key attribute of the taxonomy is that of, for lack of a better term, "ambition." This taxonomy's major contribution, in my opinion, is that it sets its sights higher with regard to the achievable than what other work in this area has estimated. Frequently, it appears that intended outcomes of visual literacy education, when not completely vague and general, are relatively low-level and mundane achievements. Although achievement of mundane learning outcomes is a necessary step along the way in most curriculum areas, the upper reaches of possible learning--the top-level goals to which enabling objectives lead--should be consciously considered and mapped out. This dictum should hold more so for visual literacy, being a movement which suggests that educators look at what they do in new and different ways. Our work should, if we are reformers, result in learning which is more advanced than that which is provided by conventional means.

Conclusion

This paper has sought to show that the parallels between perceptual and cognitive functioning suggest that benefits can accrue to children who receive perceptual training throughout their school years. A goal of education should be for advanced perceptual development. Advanced perceptual development could provide advances in what ordinary people can expect to be able to do with their minds which might be equivalent to what verbal literacy contributes to the thinking and problem-solving skills of ordinary people. If I am correct in my comparison and in my estimate of the cumulative learning effect from long-term work in perceptual skill development, the benefits of advanced perceptual development training can be enormous.

REFERENCES

Arbuthnot, J.B., & Gruenfeld, L. Field independence and educational-vocational interest. (1969). *Journal of Consulting and Clinical Psychology*. *33*, 631.

Arnheim, R. *Visual thinking*. (1969). Los Angeles: University of California Press.

Ausburn, L.J., Back, K.T., & Hoover, B. (1976, April). *A comparison of remedial and non-remedial readers on selected perceptual style variables*. Paper presented at the meeting of the Association for Educational communications and Technology, Anaheim, CA.

Aust, R.J. and Harrington, R.G. (1987). *Training for visual intelligence*. Paper presented at the meeting of the International Visual Literacy Association, Tulsa, OK.

Back, K.T., Stansell, V., Ragan, T.J., Ausburn, L.J., Ausburn, F.B., and Huckabay, K. (1979). *Cognitive styles: A bibliography and selected annotations*. AFRHL-TR-78-90 (II). Brooks AFB, TX, Air Force Human Resources Laboratory.

Bruning, W.A. (1974). *Visual aptitude as it relates to student achievement in reading and mathematics*. Unpublished doctoral dissertation, University of Oklahoma.

Debes, J.L. (1969). The loom of visual literacy. *Audiovisual Instruction*, *14*, 25-ff.

Erickson, R.C. (1969). Visual-haptic aptitude: Effect on student achievement in reading. *Journal of Learning Disabilities*, 21-25.

Gainer, W.L. (Ed.) (1974). *Santa Clara inventory of developmental tasks*. Santa Clara, CA: Santa Clara Unified School District and Richard L. Zweig Associates.

Gardner, R., Holzman, P.S., Klein, G.S., Linton, H., & Spense, D.P. (1959). Cognitive control: A study of individual consistencies in cognitive behavior. (Special issue). *Psychological Issues*. *1*, (4).

Kagan, J. (1969). *Matching familiar figures test*, (Available from Mr. Kagan, Harvard University, Cambridge, MA).

Kagan, J. (1965). Individual differences in the resolution of response uncertainty. *Journal of Personality and Social Psychology*, *2*, 154-160.

Kagan, J., Pearson, L., & Welch, L. (1966). Conceptual impulsivity and inductive reasoning. *Child Development*, *37*, 583-594.

Lowenfeld, V. (1945). Tests for visual and haptical aptitudes. *American Journal of Psychology*, *58*, 100-112.

Messick, S. (1970). The criterion problem in the evaluation of instruction: Assessing possible, not just intended, outcomes. In Wittrock, M.C. and Wiley, D.E. (Eds.), *The evaluation of instruction: Issues and problems*. New York: Holt, Rinehart & Winston, 183-210.

Moore, M.R. (1970). The perceptual motor domain and a proposed taxonomy of perception. AV Communication Review, 18, 379-413.

Olia, F. & Ragan, T.J. (1980, April). A taxonomy of visual literacy. Paper presented at the meeting of the Association for Educational Communications and Technology, Denver, CO.

Ragan, T.J. (1977, May). Relationships between visual literacy and visual memory, development, and aptitude. Paper presented at the meeting of the International Visual Literacy Association, Iowa City, IA. (a)

Ragan, T.J. (1977, April). Visual literacy and the brain. Paper presented at the meeting of the Association for Educational Communications and Technology, Miami Beach, FL. (ERIC Document Reproduction Service No. ED 180-349) (b)

Ragan, T.J., Back, K.T., Stansell, V., Ausburn, L.J., Ausburn, F.B., Butler, P.A., Huckabay, K., & Burkett, J.R. (1979). Cognitive styles: A review of the literature. AFHRL-TR-78-90 (I). Brooks AFB, TX: Air Force Human Resources Laboratory.

Santostephano, S.G. (1964). Developmental study of the cognitive control "leveling sharpening." Merrill-Palmer Quarterly, 10, 343-360.

Spache, G.D. (1976). Investigating the issue of reading disabilities. Boston, MA: Allyn & Bacon.

Templeman, K.D. (1962). A study of the relationship between the haptic and visual creative types and reading achievement in first and sixth grade children. Unpublished master's thesis, Cornell University, Cornell, NY.

Witkin, H.A., Moore, C.A., Goodenough, D.R., & Cox, P.W. (1977). Field dependent and field independent cognitive styles and their educational implications. Review of Educational Research, 47, 1-64.

Witkin, H.A., Oltman, P.K., Raskin, E., & Karp, S.A. (1971). A manual for the embedded figures test. Palo Alto, CA: Consulting Psychologists Press.

Video -- Friend or Foe? or How to Teach the Reading of Seeing

Barbara A. Dobbs

The terms visual instruction and visual literacy have been around since the 1920's, but what have educators done to ensure that students are visually literate? Schools and school districts have done a nice job of building film/video libraries, collections of filmstrips, filmstrip kits, posters and charts, but have educators done the necessary student instruction of how to view and interpret what is being seen in these media? It would appear not.

In the 1970's some schools made an attempt to instruct students in the art of viewing film as a literary form. Those curricula died a slow death because they were not global in their approach. The visual literacy skills that were taught in those isolated classes were not transferred to other curricula and, more important, were not transferred to the students' world outside of the classroom.

Today's students are much more visually oriented than were former students. Home video and cable television have given students the opportunity to select and view a greater number and variety of programs than ever before. The home video industry has had an impact on education as well, not only with the availability of feature-length entertainment films now being brought into the classroom, but students are inundated with visual information at home. How is the education community dealing with the issues of student utilization of visual information and the quantity and quality of programming brought into the classroom from outside sources? It is not dealing with them at all.

The fact that today's students are spending more time and money on visual entertainment should indicate that the schools should be teaching students how to gain information from, as well as, interpret what they are seeing. Students are taught to read the printed page as well as interpret the subtle nuances of literature all through their school careers. They should also be taught how to transfer those reading strategies to visual media so that they will become more critical viewers of what they see and as a result, more critical thinkers about the information that

20

affects them. Students today spend more time viewing information than they do reading information, yet educators make the erroneous assumption that these students may know how to view as if it were a natural skill.

Another problem that arises from the home video market is the use of feature-length films in the classroom. These may be rented very cheaply and as long as the copyright guidelines for use are followed, their educational use is legal. The problem here is how the educator is using the movie. Is it being shown in its entirety, and can a teacher afford the time out of the curriculum? How does that affect the overall instructional program? Is the video suited to the students' maturity and ability levels? Is the video the best way to convey information? What has the teacher done to prepare the students for receiving the information?

These questions can be answered by teaching teachers how to adapt reading strategies to visual media. Visual literacy is a global skill, similar to reading or information skills in that it is present in every learning situation. Therefore, it is every teacher's responsibility to incorporate the instruction of these skills into all curricular areas. Library media specialists have the unique responsibility of instructing teachers in these skills since they have the background in both print and non-print media as well as being in direct contact with classroom teachers and their students.

Adapting reading strategies to a visual medium is not difficult. The basic premise is to divide the viewing into three parts; pre, during and post, just as a teacher would do with a reading assignment. Previewing activities lay the ground work for students to receive information. The teacher must bring forward in the students' minds prior knowledge that will spark an association with the new knowledge and pave the way for understanding. The next step is where most teachers fail. During the reading process, a student will self-monitor what is being read and realize what is known and what is not known. If the information read is known and understood, the reader continues. If the information read is not known or not understood, metacognition takes place and the student will reread the passage until it is understood or seek outside help (through a dictionary, adult help, other materials, etc.) in order to fully understand the information. This process may take seconds, minutes or hours depending upon the prior knowledge base of the student.

Most frequently when teachers plan for students to watch a video tape, they allow for only one showing, never considering that not all students will comprehend at the same rate. Students should be allowed to employ their metacognition skills just as in reading, by viewing and reviewing those sections of the video that they don't understand until comprehension is achieved. The basic advantage of the video medium is that it provides reverse scan and playback within seconds.

It is also in the "during viewing" stage that many teachers make errors in presentation by thinking that the entire video must be shown. Again, because the nature of the medium allows for ease of use, specific sections of the video may be used to highlight a concept, make a dramatic point or bring the essence of a piece of literature in sharp focus. By using only small segments of a video to highlight the most important points of a lesson, the teacher reinforces visual literacy skills as well as teaches a curriculum objective.

In the final step, post-viewing, the teacher assesses whether or not the students have achieved the level of comprehension desired. The techniques for this assessment can be varied according to the learning styles of the students. If the teacher determines that not all students have met the objectives of the lesson, it is simple to set up the equipment and let a smaller group of students review the video segments again, either with a peer tutor or the teacher. As in any lesson, closure must be realized in order to assess achievement and move on to the next objective.

The use of video in the classroom, whether educational, interactive or commercial entertainment, will not diminish in the future. It will continue to rise as it has over the last five years. Library media specialists have a responsibility to instruct fellow educators in the correct usage of this medium. Teachers must infuse these skills into every curriculum taught in order that students will gain the skills necessary for critical viewing both in and out of school.

BIBLIOGRAPHY

Allen, Don. "'And Everyone Quoted McLuhan a Lot . . .'--An Autobiographical Retrospective on the Media Studies Movement". Media & Methods, Sept. 1980, pp. 22-28+.

Aurora Public Schools. Middle School Reading Inservice Packet Grades 6-8, March, 1987.

Bue, Marion. "Turning Mirrors into Windows: Teaching the Best Short Films". Media & Methods, Dec. 1984, pp. 9-13.

Dorris, Anna Verona. Visual Instruction in the Public Schools. Ginn & Company, Boston, 1928.

Dwyer, Francis M. Strategies for Improving Visual Learning. Learning Services, State College, PA, 1978.

Greiner, Charles F. "Before You Kill the Lights". Media & Methods, Dec. 1979, pp. 35-38.

Johnson, William H. Fundamentals in Visual Instruction. Educational Screen, Chicago, 1927.

Notar, Ellen E. and Robinson, Rhonda S. Active Student Involvement Focusing on Critical Analysis of Commercial Television. Paper presented at the Annual Meeting of the American Educational Research Association, Boston, 1980.

Ploghoft, Milton E. "The Argument for TV Viewing as a Language Arts Skill". Media & Methods, Oct. 1980, pp. 27-30.

Seidman, Steven A. "Music Video Grows Up". Media & Methods, May/June 1986, pp. 8-9.

White, Mary Alice. An Educated View of Technology. Paper presented to the Board of Regents of New York State, 1985.

THE VIEWING AND READING CONNECTION

The skills necessary for viewing videos and films are the same as those for reading, with some adaptations to the medium. These skills can and should be taught along with reading skills to all students. Reinforcement of these skills is necessary at all grade levels to insure student growth toward sophisticated viewing.

PRE-VIEWING TECHNIQUES

Planning activities before viewing a video/film will

*provide motivation
*expand content knowledge
*increase comprehension
*facilitate learning strategies
*focus attention

Some pre-viewing activities that may be used are

*discussion of background knowledge
*an anticipation/prediction guide
*teacher-directed viewing
*attitude survey
*knowledge chart
*discussion of visual or graphic clues
*introduction of a focal point outline,
  story map, advanced organizer
*introduction of new vocabulary

DURING VIEWING

This is where reading techniques must be adapted to the medium of video/film. During reading students learn to self-monitor what they know and what they don't know (metacognition). They do this by being able to reread a passage in a book, magazine, or newspaper. They are in control of how many times they need to read the passage until they have understood the concepts.

When viewing a video/film, the teacher often assumes that seeing the video/film once is enough for comprehension. Students are not in control to self-monitor and repeat the viewing until the concepts are understood. This then becomes the teacher's responsibility. Therefore, the teacher must allow two or more viewings for students and provide them with tools to enhance their comprehension.

TECHNIQUES FOR SHOWING A VIDEO/FILM

There are a number of techniques which may increase the effective comprehension of the video/film. The teacher will not use all of these each time a video/film is shown, but a variety depending on the learning objective.

* PLACE and VCR on pause or the projector on still mode. Then use the picture for discussion and careful study.

* STOP the VCR or the projector - back up - reshow a short segment - ask students to carefully watch a given action.

* SHOW a second time. Make different viewing assignments. Let students narrate it or show it without the picture - ask students to describe the action verbally or in writing.

* SHOW SEGMENTS of more than one video/film for comparison or contrast. Set up several VCRs/TVs or projectors. Use to contrast cultures, ideas or happenings.

* STOP the video/film. Discuss what they have just seen. Ask higher level questions like "How would you feel if . . ." Use to develop oral communication skills.

POST VIEWING ACTIVITIES

After viewing activities should help students make the connection between new knowledge and previous knowledge. The activities should also reinforce and extend ideas and concepts.

Some post viewing activities that may be used are

*each student share one new idea learned, either orally or written
*follow up vocabulary activities
*completion of knowledge chart
*teacher-directed, open-ended questions
*group determination of main ideas
*summarizing information either orally or in writing
*completion of focal point outline, story map, advanced organizer
*answering the 5 w's and the h: who, what, where, when, how and so what, either orally or in writing

Prepared by Barb Dobbs and Bill Murray
Media Services
Aurora Public Schools
875 Peoria St.
Aurora, Colorado 80011

24

Teaching Visual Literacy to Teachers

Robert Muffoletto

Designing a course for teachers called "Visual Literacy" requires of the designer not only an understanding of what it means to be visually literate, but also why it should be taught to teachers at all. Why incorporate into an already threatened discipline, one more course, more theory, and more practical concerns. The question is simple, the answer is not. Throughout the twentieth century, a great amount of the information we receive comes to us in the form of images or some other mediated form. Embedded in these mediated experiences are assumptions about what reality and experience is. In the 1980's, we the receivers of constructed experiences, must address the questions centering on whose experience are we experiencing and what is its effect upon us and others. As educators, we have another concern. Not only must we be conscious of mediated experiences and their effect on us, but as gate keepers, we must be aware of the meanings we pass on to others in the name of education.

Teachers who are visually literate, are not passive vessels or vehicles for constructed realities, but are active, critical participants in the deconstruction of experience and the construction of other realities. Visual literacy is taught to teachers so that they may participate in the critical investigation of meaning; how it is created, why it is created, and who benefits from it.

In other words, to teach teachers about visual literacy is simply not to teach them about elements of design and production, or about dissemination and interpretation. It is to teach them about ideology, about meaning, and about power, and its effect upon their lives and the lives of others. To teach teachers about visual literacy is to empower them to teach their own students about critical thinking and deconstruction. It teaches them not to see the world and its artifacts as givens, but as constructions with a purpose. Once teachers are empowered to see and hear the world differently, that is breaking away from a "common sense" notion of what they experience, they can be and must be held responsible for their actions and inactions.

To proceed any further we must have a working definition of visual literacy. My definition of visual literacy evolved out of a history of working with images and their meanings. For me, to be visually literate simply means for an individual to have the ability to understand images as intentional constructs of communication. To comprehend images as results of intentionality requires an understanding of the productive process, that is how do images come into existence. (My definition does not necessarily include or exclude skills in production.) Understanding images as structures of communication also requires of the reflective viewer an investigation into the effects of dissemination on the intended message, and on its reception as an interpretative experience by a receiver. **Visual literacy, as well as print literacy is about making, disseminating and receiving artificial experiences.** In understanding the productive, dissemination, reception process, I assume that individuals will know how to use them. How and why all of this becomes meaningful is the essence of any course on literacy.

A Course Of Study

A course of study in visual literacy should include experiences in a number of different but overlapping areas. This would include (1) foundations in perception and learning theory, their histories, their limitations and their historical and contemporary applications. (2) Semiotics from a structuralist and post-structuralist perspective, as it applies to images and representation. (3) Students investigating how representations come into existence need to become familiar with various modes of production. (4) They will need to investigate and develop various analytical skills needed to critically and reflectively deconstruct the visual text and various responses to it. And finally, (5) students of visual literacy would need to develop the necessary skills to critique various models of communication in an attempt to understand their implications for practice.

By forming connections between perception and learning theory, students will begin to form the foundation for understanding the relationship between image utilization and learned behavior. As educators the questions embracing these relationships must be considered. For example, How has the operant conditioning model affected how teachers teach utilizing images?; What is learned from images and how is that learning measured?; and What are some of the effects of learning from images on how learners think about themselves, others and the acquisition of knowledge?

Semiotics as a model of communications, presents the learner with a structure for understanding how objects, real or imaginary, become meaningful. Through possible relationships formed between the signifier and signified, between the paradigmatic and the syntagmatic, the learner becomes familiar with some of the structural relationships of semiotics and meaning. Once a basic understanding of semiotics is grasped, the limitations of its theoretical base must be considered. In doing so it becomes necessary to move beyond the structuralist model to a post-structuralist or post-semiotic model for investigating the construction of meaning. In doing so, the course of study must address the issues and questions raised by reception theory in its quest for locating the source of meaning.

The visual literacy curriculum will also need to address practices and theories of image production. It is necessary for individuals who are intentionally working with images to communicate ideas to themselves or others, to be aware of, and if possible (but not necessarlly), skilled in various production practices. Some of the questions that must be considered here are, "How do images come into being and for what reason?" One way to address these questions is for students to create messages (intended meanings) with images. To accomplish this requires moving beyond the mere acquisition of production skills needed to make an image, to an understanding of the utilization of various visual codes in the message production process.

Analytical skills will be needed to deconstruct or decode the developing image which has now become a "text". A text is something to be read. "It" exists within a contextual and conceptual framework between producers and readers. Analytical skills are needed to deconstruct the process of making meaning in order to reveal other meanings or readings of the text. The text in this context is fluid, holding no absolute meaning except for the one at the moment of its reading.

In deconstructing various models of communication the student should be able to conceptually locate the relationships between the producer(s), the text, and the reader. Questions founded upon power and control are the bases to such investigations. For example: Does the common sense notion of communication present the production process as being neutral and objective with no sensitivity to ideological reproduction and maintenance? Is the receiver of the text understood as being passive or active, with no role in the production of meaning? Is the text itself seen as only an object, with no history or future? Is the meaning of the message located in the producer, the text, or the reader of the text? To understand different constructs of communication the student will eventually need to inquire into the social, political and historical nature of meaning and its effect.

A Course in Visual Literacy

Considering what I have discussed above, a course in visual literacy would actually need to be a program in visual literacy. To cover the issues, to provide time for the skills to be practiced and sharpened, and to provide a conceptual framework for the theoretical, requires time not only for presentation and initiation, but for digestion and solidification.

The course in visual literacy that I will be discussing for the remainder of this paper attempts to address much of what has been discussed in an introductory or overview format. The course is a graduate level course in the Teacher Preparation Center, at the California State Polytechnic University at Pomona. It is one within a series of courses leading to an Masters of Arts in Education with an emphasis in Educational Technology, and a sequence in Media Studies. The students are primarily teachers who are returning for Masters degrees for a range of reasons. The majority of the students have no history of working with or thinking about images and meaning, let alone any experience with various media technologies. The 3 unit course is presented over a ten (10) week period of study, with three hours allowed for each of the ten sessions.

From the first session, and with frequent reminders, the students are informed that this course is a process course, and that they will be actively involved in the production of meaning and interpretative strategies. They are informed that the process they will experience should be understood as experimental with no correct, incorrect, or expected response. Students are not required to produce products, but to invest in an experimental process. The course attempts from a process oriented, non-judgmental position to eliminate the fear of failure and competition. For most students, this is their first experience at taking seriously an activity they have taken for granted.

Course Structure

The course is structured in the following way. First the students are introduced to the notion of experiencing. The questions are: "What does it mean to experience?"; "What does it mean to experience an image?" The next two sessions work through some basic concepts in gestalt perception theory and two dimensional design. By the fourth session the students have read John Berger's text, "Learning To See" (19??), and have had an introduction to semiotics, reader theory and models of communication. The fifth session is dedicated to the discussion of the second experiment and the development of interpretative models, building upon a post-semtiotic model. The sixth session moves the students into issues surrounding sequencing and visual books as a visual event. Attention is paid to John Horton's paper entitled "A Theoretical Model For Understanding the Visual Event". The seventh session the students are given their final exam. The exam poses the question; "Given a visual/audio experience produce a response in visual. audio, visual/audio, or kinetic terms." The presentation of the exam usually consumes most of the session. Their answer/response is due and presented at the last session. Session eight addresses questions concerning knowing and knowledge in relation to curricular matters. In session nine the students present curricular projects for their grade level. Session ten is left to discussion and critiques of the final exam (This usually falls in exam week).

Discussion

It is the purpose of this course that students will become sensitive and aware of the following:

(1) Images are constructed forms intended to communicate a message;

(2) Messages are encoded, incorporating elements which are meaningful to both the producer and a perceived, created receiver or audience;

(3) Readers of visual texts either reproduce intended meanings or create new meanings. Readers of the text are not passive, but are active;

(4) Readers, like producers, are members of social communities which effect their encoding and decoding of the text;

(5) Images are not neutral artifacts, but are constructed texts, intended to be read, image as text -- text as image;

(6) The production or encoding of texts and the decoding or reading of the text is a subjective process. Being subjective, image texts are political in that they address issues regarding gender, race, class, and power.

(7) Educators must be visually literate to understand the nature of the visual experience, its range of meanings, and its implications for the development of consciousness in themselves and their students.

To the extent that students become aware of the above is dependent upon many variables. Disposition towards the process and critique of visual expression are the most crucial, and at times, have been the most difficult to address. Because issues and practices addressing visual communication have practically been absent from a teacher's education, the importance of a critical theory relative to visual education has never been recognized. It is important then, that a course in visual literacy not be an other name for a art course, but is a course in critical thinking.

Critical thinking, by its very nature is not tolerant of common sense practices and will act to deconstruct not only the question at hand, but its own process for addressing the question. A course in visual literacy for teachers can not be viewed as a black box in a teacher's curriculum, it must be part of a course of study which is based upon critical theory, critical inquiry and reflective thought. To work towards less, would lead to the reification of knowledge and reproduction of the status-quo. What I am calling for here, is not just a course in visual literacy, but a pedagogy in teacher education that is based upon inquiry and reflective thought. A course of study where techniques and methods are linked to the critical investigation of teaching, learning and knowledge.

A Position On Student Evaluation (a continuous after thought)

I have found it almost impossible to identify to myself clear terms and criteria for the evaluation of the visual literacy course I discussed above. The problem I have given myself is to reject the "means-ends" model of instruction and evaluation by confronting a process model which does not clearly point anywhere. If I am to hold the position that meaning, from a receptionist perspective lies somewhere in that space created between the text and the viewer, then I can not hold expectations for student responses to the experiments and to the final exam. If this is a true process course, then I must see myself more as a facilitator and less as an instructor. I can not attend to my students as if they are empty vessels, waiting to be filled. I must maintain the attitude that I will learn as much from my students as they will hopefully from me. Grading in this course has been linked to the completion of tasks by due dates, not on the level of response or inquiry. I have found in the past that this attitude creates an open, non-competitive atmosphere for discussion and inquiry. It may also lead to actions by students that misuse the process, approaching the course as a simple "cut and paste" activity and as an easy grade. This is the risk that all educators take with this format. I have learned to live with it, but not to like it.

Bibliography

Apple, M. Ideology and Curriculum. Boston: Routledge & Kegan Paul, 1979.

Balsey, C. Critical Practice. New York: Methuen, 1980.

Becker, A. A Teaching Model for the Grammar of Television. Journal of Visual Verbal Languaging. Vol.6, No.1, Spring 1986, pp.41-48.

Berger, A. Media Analysis Techniques. Beverly Hills: Sage Publications, 1982.

Berger, P. & Luckman, T. The Social Cconstruction Of Reality. New York: Anchor Books, 1966.

Berstein, B. Class, Codes and Control: Towards a Theory of Educational Transmission. Boston: Routledge & Kegan

Bronowski, J. The Orgins of Knowledge and Imagination. New Haven: Yale University Press, 1978.

Coward, R. & Ellis, J. Language and Meterialism. Boston: Routledge & Kegan Paul, 1977.

Culler, J. Fredinand de Saussure. New York: Penquine Books, 1976.

Curtiss, D. Introduction To Visual Literacy: A Guide to the Visual Arts Curriculum. Englewood Cliffs:Prentice Hall, 1987.

Eagleton, T. Criticism and Ideology. London: Verso Editions, 1976.

Eagleton, T. Literary Theory: An Introduction. Minneapolis: University of Minnesota Press, 1983.

Eagleton, T. The Function of Criticism: From the Spectator To Post-Structuralism. London: Verso Editions and NLB, 1984.

Freire, P. Pedagogy of the Oppressed. New York: Herder and Herder, 1971.

Fish, S. Is There A Text In This Class?: the Authority of Interpretive Communities. Cambridge: Harvard University Press, 1980.

Goffman, E. Frame Anylysis. New York: Harpeer & Row, 1974.

Grant, C. Preparing For Reflective Teaching. Boston: Allyn and Bacon, Inc., 1984.

Greenfield, P. Mind and Media: The Effects of Television, Video Games, and Computers. Cambridge: Harvard University Press, 1984.

Habermas, J. Knowledge and Human Interest. Boston: Beacon Press, 1968.

Hawkes, T. Structuralism and Semiotics. Berkely: University of California Press, 1977.

Hall, S. Encoding/decoding. In S.Hall, D. Hobson, A. Lowe & P. Willis (Eds.), Culture, Media, Language. London: Hutchinson & Co. Ltd. 1980.

Holub, R. Reception Theory: A Critical Introduction. London: Methuen, 1984.

Langer, S. Philosophy in a New Key: A Study in the Symbolism of Reason, Rite, and Art. Cambridge: Harvard University Press, 1942.

Laybourne, K. , Cianciolo, P. Doing the Media. New York: McGraw-Hill Book Company, 1978.

Leach, E. Culture and Communication. New york: Cambridge University Press, 1976.

Metz, C. Film Language. New York: Oxford University Press, 1974.

Metz, C. The Imaginary Signifier. Bloomington: Indiana University Press, 1977

Muffoletto, R. Towards A Critical Pedagogy of Media Education. Unpublished doctoral dissertation, University of Wisconsin at Madison, 1984.

Nicholas, B. Ideology And The Image. Blommington: Indiana University Press, 1981.

Norris, C. Deconstruction: Theory and Practice. London: Methuen, 1982.

Schiller, H. The Mind Managers. Boston: Beacon Press, 1973.

Schiller, H. Communication and Cultural Domination. White Plains: M.E. Sharpe, 1976.

Wolen, P. Signs and Meaning in the Cinema. Bloomington: Indiana University Press, 1969.

Worth, S. Man is not a Bird. Camera Lucida. No. 5. 1982.

Wuthnow, R., Davison Hunter, J., Bergesen, A. & Kurzweil, E. Cultural Analysis. Boston: Routledge & Kegan Paul, 1984.

How I Teach Video Literacy in My Basic Educational Media Classes

Earle E. Williams

Visual literacy as a part of the field of educational technology is taught in the basic educational media classes at East Texas State University. In these classes we use the text, Instructional Media and the New Technologies of Instruction by Heinich, Molenda, and Russell. The chapter on visual literacy is Chapter Three. Its early inclusion in the text is indicative of the fact that the authors hold this to be part of the "basics" of instructional media. The first chapter is a general outline of instructional technology inside and outside the school. The second chapter deals with instructional design, another important "basic", both in instructional technology and in education in general. Therefore, the inclusion of a chapter on visual literacy with these two others attests to the importance of visual literacy. This is something with which I very strongly agree.

My teaching style is somewhat unusual. I have had students say it's worth coming to class just to find out what I'm going to do next. Therefore, if I say things in this presentation which don't appear to apply either to the topic of visual literacy or to instructional technology, it is because of my teaching style and my viewpoint on visual literacy and its important place in the curriculum. I am a teacher educator. I like what I do and feel a sense of purpose and fulfillment in my job. As a teacher educator, I believe that we don't need to be bound by the fences, walls, or other bastions of our disciplines. Being a teacher educator is a responsibility I assume with a sense of a holistic purpose. There are certain themes which are important enough to cause us to repeat them and to integrate them at many levels in the learning process. Visual literacy is such a theme. I work in the affective domain frequently and some of the things I say and do, though not necessarily strictly adherent to subject matter, are a part of a sense of enthusiasm about education and people. Every semester, in every class, I try to make the point that as teachers we are in the people business. I say without apology that I use the visual literacy segment of my courses to accomplish this end.

I begin my discussion by asking my students if they have seen the nude in Chapter Three. There is actually a picture of a young boy standing nude next to the bathtub having his hair cut by his mother. The caption on the picture tells us that the picture was taken in France. I tell my students to disregard the caption (after they finish enjoying the practical joke about the nude) and tell me where the picture was taken. The bathtub in the picture is of a design unfamiliar to most Americans. The faucets are located in the center of one of the sides of the bathtub rather than on the end as would normally be the case in this country. The woman in the picture is dressed more formally than women usually dress to bathe their children in this country, at least according to the opinions of my students. She is wearing a scarf, which would seem to get in the way of bathing a child. In addition, there is also another child in the bathtub. This child appears to be a girl, according to the inferences drawn by my students. If she is a girl, the fact that the boy and girl are in the room this way is judged to be rather unusual. The caption tells us that this type of picture can provide practice in "reading" visuals on various levels.

As an illustration of the lack of visual literacy in much of the population, I like to use the quotation, "Many people look, but few people really see." The idea for this comes from the film "You Can Surpass Yourself". In this film Dr. Eden Ryl attempts to teach the lesson that human beings can attain seemingly impossible goals. This film and others in her series from Ramic Productions are testimony to the potential within each human being. In one segment of this film, two people are throwing a frisbee. One player tells the other that he didn't see it. The other player responds that many people look but fail to really see. A better program of visual literacy in the schools might result in a population which not only looks, but also sees.

I call the attention of my students to the definition of visual literacy according to the authors of the text: "Visual literacy is the learned ability to interpret visual messages accurately and to create such messages." There is also another definition which I provide my students in a handout and which we discuss in detail reinforced by a transparency. This definition was originated by John Debes (1969).

> Visual literacy refers to a group of vision competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable the visually literate person to discriminate and interpret the visible actions, objects, and/or symbols, natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use of these competencies, he is able to

> comprehend and enjoy the masterworks of visual communication.

Both of these definitions are interpreted in light of their attention to encoding and decoding. The parallel is often made between visual literacy and print literacy regarding reading and writing with visuals. As an ex-English teacher I liken this parallel to the active and passive voices in grammar and sentence structure. In the active voice, the subject is performing the action. In the passive voice, the subject is acted upon. Writing (encoding), whether with words or visuals, is for the purpose of this analogy, in the active voice. Reading (decoding), whether words or visuals, is parallel to the passive voice. I emphasize, however, that the analogy breaks down when one considers how involved one can become in reading. Reading in itself is not passive, but from the point of view that one is acted upon by the words of others, the parallel exists.

Two other principles are also brought out in the Debes definition. The first is that visual literacy can be taught. The second is that visual literacy is fundamental to normal human learning. If we accept these two principles as true, it follows that the teaching of visual literacy deserves a place in our educational system. However, this author believes that there are too few examples of programs in schools which are intended to teach visual literacy.

Another pair of pictures in the textbook depicts two principles which are symbolized uniquely in America. One of them is symbolized by a bell with a crack in it. In some societies, this bell would mean that it is time to buy a new bell. In America, however, the symbolism is that of liberty. There is another picture which depicts a blindfolded woman carrying a scale in one hand raised high and a sword in the other held low. In some societies, this statue might represent a work of art, an unusual, even comical picture, or some other meaning other than that in this society, which is justice. I cite these as culturally bound symbols, as do the authors of the text.

It is at this point that I ask my students how many of them have ever taken a visual literacy test. The example used is that I ask them how they got to class. "Did you drive?" I ask. "If you drove legally in the state of Texas you have taken a visual literacy test." Some at this point are able to deduce that what I am referring to is the state driver's license exam. The part of the exam which contains what seems to be such a test is the part in which the examinee must describe the various types of road signs by their shapes alone. I say,"What does an eight-sided sign mean? What does an upside-down triangle mean? What does a diamond shape mean?" If I catch some delay in answering, I frivolously tell those who cannot answer to please leave the campus before I do tonight so that we're not on the road at the same time, since they don't know what the signs mean.

An example of the principle that states that a picture is worth many words is illustrated by the round sign. At this point I take the role of the railroad sign which, if it could talk, would say, "See these tracks? Have you heard of Newton's first law of motion? In Newton's first law of motion it is stated that an object in motion tends to remain in motion. There is a large mass that periodically (I don't have the schedule here) moves along these tracks at a reasonably high speed. It will tend to remain in motion even if you get in the way and try to stop it. If you do try to stop it with your Toyota it's likely that your Toyota will receive the worst of the situation. Therefore, when you see me, I suggest that you use caution." Through this illustration it is possible for students to realize that visual symbols are a language, and that signs by the side of the road are a part of this visual symbolic language which is encountered every day. There are other signs upon which a student's life is much less likely to depend. These include pictures of a tent, a gas pump, a man, a woman, and others which assist a driver in many places in the world today. As a further illustration of this language, I draw a circle with a line through it on the chalkboard and ask the students what it means. The answer is that it means "No... something." If I put a P in the circle, it means no parking (A student once said it meant "no peeing").

Visuals are authored much the way print communication is authored. The author of a picture can deliberately manipulate the data or information available to the viewer through such things as lighting, point of view or angle, size distortion, or inappropriateness to audience age level. The latter type of manipulation may be used constructively to challenge students or to promote divergent thinking. This emphasis on "authorship" of visuals is a recurring theme in the group of slides which forms the nucleus of my visual literacy exercise.

In writing a paper such as this, it is impossible to describe in verbal terms each individual slide. Therefore, I will try to highlight some of the points which are brought out in the presentation and which have the most relevance to the study of visual literacy. The activity and interaction with my students is, from their point of view, a decoding activity. The slides are used without a prerecorded narration. I merely present them one by one, each as an individual image and each with an individual lesson, but for the purposes of this paper it will be easier to put them into categories.

The first few slides include picture and object recognition challenges, including unusual and unfamiliar objects. During these slides there are several principles mentioned, including the fact that information on the edge of a picture tends to be less visible than that in the center. Although I have never done or read research to prove my intuitive feelings on the subject, I always tell my students about cigarette advertisements and how the warnings are always placed along the edge or in a corner of an advertisement. This can also be thought of as parallel to the fact that the cigarette package itself contains a warning on the side of the package, and who reads the sides of a package?

One slide depicts a golf ball flying through the air very close to the camera. There is a pine tree and a hill in the background. I divide the class into two groups. One group is asked to play the part of kindergarteners, the other is asked to play the part of normal adults (if possible). "Kindergarteners, what do you see in this picture?" Responses include "the sun", "the moon", "a spaceship", and sometimes "a golf ball". I question whether a student in kindergarten would know and recognize a golf ball, especially one flying through space and obviously spinning. The purpose of this is not to criticize a student but to bring out the fact that object recognition is a learned behavior. The other side of the room is then asked to tell me what is in the picture. Of course, a golf ball is always mentioned. In addition, it is more likely that a student will mention the pine tree and possibly the hill in the background. After I remind the kindergarteners that they may again act like normal adults, I sum up what has happened by citing the principle of picture reading levels.

There are three levels of picture reading as we cover the topic. The first is recognition of objects. It is emphasized that if one is to teach a young child to recognize such things as horses it is best to show the child a simple picture, photograph, or line drawing of a horse alone and not a knight on a horse or a cowboy on a horse. A young child is at the earliest picture reading level, that of object recognition, and to add extraneous cues might confuse him. This is the reason that a student in my class who effectively plays the role of a kindergartener would be more likely to see the picture as two-dimensional, simple, and to see the sun, the moon, or a spaceship.

The second picture reading level cited is the recognition of details. This level depends upon the first for its attainment, for details are not possible without knowledge of objects. A detail might be recognition of a pine tree as opposed to the mere recognition of a tree. If a child's experience included knowledge of a golf ball, he might name the golf ball. Not having attained fully the third picture reading level, the child might become confused by the apparent size of the golf ball, for in order to truly recognize it as a golf ball he must be able to draw an inference that the golf ball is close to the camera and therefore appears larger.

This brings us to the third picture reading level, which is the drawing of inferences. It is my belief that every picture causes any viewer who has attained this picture reading level to draw an inference. The argument might be made that the degree of ability to draw inferences from visuals is dependent upon one's level of visual literacy. An inference might be elicited from the class when a question such as "What would you say to the photographer?" is asked. The desired response would be, "Fore!"

"Duck!" or "Get out of the way!" Other responses have included "President Ford must hav e hit this golf ball." Now that is a big, fat inference! I have also asked students how many of them remember Spiro Agnew, Nixon's first vice-president. During his tenure in office he was known to have beaned a spectator on the golf course. May I say I am integrating the study of history into my study of visual literacy?

This leads to a series of several slides which are intended to elicit inferences from the students. These include a student opening a door and peering in (who, where, why?), a man who seems to be falling over in a chair (who, why?), and a child in post-war Europe holding a pair of shoes (where, when, why?)

Part of being visually literate is the ability to read body language and to draw inferences from the placement of hands and other body parts in a picture. The next series of slides constitutes what I call "the hands segment". One slide depicts a pair of hands clutching a piece of cloth. "Whose hands are these?" I ask. "A widow" and "the mother of the bride" are the most common responses. This makes the point that a picture can elicit completely opposite interpretations from different readers of a visual.

Games and National Geographic World magazines provide important visuals which are used next. These come from the "Eyeball-Benders" section in Games and the "...what in the world?" section of National Geographic World. Students always enjoy and are challenged by the recognition of details in familiar objects, close-ups, and hidden clues in these pictures. I also have a Norman Rockwell Saturday Evening Post cover which contains deliberate mistakes and incongruities, and a Boy's Life cover which includes visual puns such as a match wearing gloves (a boxing match), a board diving into water (a diving board), a clock carrying a sign (a clock striking), and cars in a small body of water (a car pool).

The discussion becomes more serious at this point , for it is here that I bring out such concepts as figure ground images and visual embeds. I show several examples of figure ground images from paintings and from the lithography of Charles Dana Gibson. A figure ground image from advertisement is also presented with special attention to what the verbal part of the advertisement says and how the verbal semantics parallel the visual semantics. This advertisement is dissected word for word, revealing unusual and erotic themes, as advertisements often do.

If the students appear interested enough I sometimes show them a few examples of subliminal messages in advertisements. Subliminal messages are those which are alleged to be presented in such a way that a viewer is stimulated below his conscious threshold of awareness. The ability to detect subliminal messages in advertisements indicates, in my opinion, a very sophisticated and very visually literate visual reader. The concept of subliminal advertising never fails to arouse the students' attention and is a natural accompaniment to the study of visual literacy at the college level.

The final segment of the slides is the "fool the students" segment. During the presentation I bring out at several points the idea that visuals are not always what they seem to be, that visuals are often more than what is first seen, and conversely, that visuals may appear to contain information which is not actually there. There are several slides in this segment which contain visual tricks. These are intended to conclude the slide series with the students on their visual toes. Hopefully, my students leave at the conclusion of the series more visually literate and more aware of the visual world around them.

The opportunity to teach visual literacy in this way is one of the highlights of my teaching. The feedback from students is gratifying and my collection of examples is constantly growing as students return with examples they have collected after their awareness is increased in my class.

Teach visual literacy! It doesn't matter what your teaching field might be. There are opportunities in every field of study. As our students grow more visually literate they will be more fulfilled, they will enjoy life more, and, at least in an aesthetic sense, they will be more likely to contribute to the improvement of our world.

References:

Debes, John: The loom of visual literacy. Audiovisual Instruction, 14:25-27, 1969.

Heinich, Robert, Molenda, Michael, and Russell, James D.: Instructional Media and the New Technologies of Instruction. New York, John Wiley & Sons, 1985.

Thinking Skills and Visual Literacy

Lyn Lacy

Background

"Minneapolis Public Schools is regarded as a national leader in the use of technology," MPS Superintendent Richard Green has stated. The school district's Educational Media Services (EMS) department, under Director Gladys Sheehan, has provided guidance in technological literacy training for all students, as mandated by the district's Five Year Plan and the Minnesota Department of Education's 1984 Information Technology Learner Outcomes and 1986 Model Learner Outcomes for Educational Media and Technology.

In 1985 EMS submitted a proposal to the State Department of Education to gather resources, outline an interdisciplinary K-12 approach and disseminate a finalized framework for education in visual literacy for students in MPS and three participating nonpublic schools. The proposal was accepted as a Block Grant Special Project under authority of ECIA, Chapter 2, Title V, P.L. 97-35. EMS and Margaret O'Shaughnessy, Director of Curriculum Services, supported the project with supplementary funding for materials, writing, graphic artwork, printing and presentation expenses.

After meetings during 1985-86 with an EMS Information Technology Advisory Committee and the MPS Curriculum Consultants, consensus was that an awareness-raising document presenting rationale, strategies, student goals and objectives, and overviews of visual media was needed by educators for the fostering of visual literacy in students. A year of research, correspondence and copyright negotiations with publishers resulted in an 81-pp document written by the project coordinator, entitled Visual Education: An Interdisciplinary Approach For Students K-12 Using Visuals Of All Kinds published by MPS for consultants, administrators and teachers.

Plans are underway for dissemination of the document and inservicing of teachers. In addition, Cooper Contemporary School is a K-3 pilot program in visual education under directorship of the project coordinator for the school year

1987-88. Due to rapid advances in visual technology, the district-wide MPS "Visual Education" project is seen as evolutionary, requiring updating in a manner to be decided by those who participate in its implementation.

Much of this paper is directly taken from the 1987 Minneapolis Public Schools Visual Education document. For further information about the document, see Visible and Viable: The Role of Images in Instruction and Communication, Readings from the 1987 IVLA Conference or contact the project coordinator above.

Rationale: Thinking Skills and Visual Literacy

The teaching of thinking skills and visual skills demonstrates a commonality of approach recommended by experts in both fields, most notably by Arthur L. Costa in his book Developing Minds (ASCD, 1985) regarding the teaching of thinking:

1. **Visual literacy and thinking** should both be taught throughout the curriculum.
2. **Visual literacy and thinking** should both be taught in relation to content.
3. **Visual literacy and thinking** should initially both be taught in sequential order but, once learned, neither are always used consciously and in sequence thereafter.
4. **Visual literacy and thinking** should both be taught as processes in themselves, so that students understand what they are doing and can apply processes elsewhere.

Combining the two -- thinking and visual literacy -- then presents educators with a reasonable, logical and meaningful goal for students: that they will become more **creative and critical thinkers** by identifying, analyzing, interpreting and evaluating **what they see.** In general, identification, analysis and interpretation are needed by most young viewers (and in the beginning, in that sequential order) before they can evaluate success of a visual's content within confines of its medium and apply what they see to aspects of their own lives.

As expressed by Betty Edwards in Drawing On The Artist Within (Simon and Schuster, 1986), a visual image can objectify thought because it expresses ideas or feelings that are too imprecise to fit into words; it presents information to be grasped immediately; it can delineate differences as well as point up similarities; and it defines complicated relationships that may include past, present and future. In addition, the broader mental processes of concept development, critical thinking, creative thinking, problem solving, decision making and valuing can be exercised by **using** visuals and **making** visuals in different and unusual ways that free up the mind for new thought. "Seeing things differently is part of creativity", affirms Edwards. Letting go of preconceptions, whether visual or verbal, frees the mind for innovative discoveries. In all stages of learning students should be guided to "look" deeper -- to think -- in order to fully appreciate the content and design of a visual image.

"To see, as Dr. Joshua Taylor of the National Gallery has observed, is to think. To think is to put together random bits of private experience in an orderly fashion," adds George Nelson in How To See (Little Brown, 1977). "Awareness, when awakened, has a tendency to spread and expand. Seeing is not a unique God-given talent, but a discipline. It can be learned."

Integration of the teaching of thinking skills with visual literacy is also in keeping with the whole-brain research of neuroscientists and educational theorists who stress that educating our visual sense is as important as is learning to listen and speak. From a selected review of research in "A Tapestry of Whole-Brain Learning Strategies for Teachers" by Launa Ellison and others (CQE and MPSs, 1986) the following is noted:

In American education, almost exclusive emphasis has been placed on verbal skills and the need to analyze, to form abstractions, to use the symbols of language. These tasks are attributed to the left side of the brain which specializes in grammar, syntax, and the very logic of language itself. According to research, this left brain is sequential in its ordering of information, functions in a linear manner, and processes data left to right, resulting in the ability to read, write, cipher and think objectively, convergently and literally.

But there appear to be two modes of thinking, verbal and nonverbal, the latter represented in the right hemisphere of the brain, which specializes in the figurative, the poetic, the playful. This right brain learning is not linear but spatial and processes information divergently, vertically or nonsequentially, thinking in holistic terms, metaphorically, intuitively.

So it seems the brain thinks in two ways: the left in an orderly and critical manner, noting details, and the right connecting those details into a complex whole. Each makes a unique contribution to the way we perceive the world. And two things are clear: we are each a mixture of left and right brain thinking processes and we all need to exercise both hemispheres, the visual as well as the verbal.

We are only beginning to grasp the range of functional differences among human brains and whether some people are right-dominant or left-dominant in their learning styles. But researchers have gone so far as to differentiate between the two very broadest-based learning styles and their implications for students who often inhabit different sensory worlds:

1. **Visualizers** (for whom visual imagery is the dominant sensory mode) lean toward synthesis, invention and fantasy.
2. **Verbalizers** (for whom talking to oneself is more useful than creating pictures) favor analysis, dissection and criticism.

This visual-verbal dimension is related less to intelligence or mental health than to interests and cognitive style.

Before many verbalizers can be expected to adequately communicate visually, they need training in visualization. But too often in a verbal society, pictures in the mind are regarded as a distraction, as secondary to verbalization or, at best, as a luxury. Mental imagery however offers experiences that exceed what we are able to say in words, according to Robert Sommer in The Mind's Eye (Dale Seymour, 1978), and has proven educational and personal worth:

1. As exploration without time constraints or dangers of real events
2. As problem solving and decision making
3. As private creation requiring little or no external stimulus
4. As developing or improving memory
5. As relaxation or entertainment
6. As exercise in spatial orientation, rotation, combination
7. As exercise in multisensory response
8. As spontaneous, flexible and controlled "inner storytelling"

Strategies for Thinking about Visuals

Since everyone does not always see the same thing in a visual, a general **inquiry approach**, an **aesthetic scanning** for works of art and an **image/sound skim** for moving visuals are strategies that foster thinking about visual information. In these strategies, the educator asks pertinent questions and avoids telling students what they should see or think.

Inquiry Approach

Depending on student readiness, stage of intellectual development, and specific kind of visual used, an inquiry strategy offers guidelines for identification, analysis, interpretation, evaluation and production:

1. **Identification questions**

that enable students to inventory, observe, comprehend, label, list, quantify, such as:

"What do you see?"
"Who, what, where is the image?"
"What are the colors, shapes, lines?"
"What is this type of visual called?"
"Is it still or moving, live or recorded, in color or black and white, silent or with sound?"

2. **Analytical questions**

that require students to dissect, differentiate, categorize, compare, contrast, order, such as:

"How is the visual put together?"
"What is a summary of the content?"
"How are segments of the medium used?"
"What and where are the most or least, largest or smallest, closest or farthest artistic elements?"

3. **Interpretive questions**

that ask students to synthesize, imagine, infer, predict, or produce new thought (often with study of necessary background information), such as:

"Why is the visual as it is?"
"What is the main idea?"
"How is use of this medium different from use of another?"
"What is the mood, feeling, or intent conveyed?"

4. **Evaluative questions**

that offer opportunity to judge, choose, verify, rate, dispute, conclude, such as:

"How successful is the visual?"
"Does the content have validity?"
"Was use of the medium effective?"
"What is your response?"

5. **Production questions**

that encourage children to apply, translate, report, model, construct, such as:

"Can you make a visual?"
"Can you communicate what you intend?"
"What will you need?"
"What are the steps you will follow?"

Aesthetic Scanning

"Aesthetic scanning" (Getty Institute for Educators on the Visual Arts) is a similar approach. It provides a common-sense approach to aesthetic perception and criticism that involves students in talking about their analyses of visual works of art:

Aesthetic Perception:

Sensory Properties
(Identify specific use of artistic elements)
"Can you point out and describe lines, etc.?"
"Where are they? Are they used the same way?"

Formal Properties
(Determine design principles that unify parts into whole)
"Where did visualmaker place important idea?"
"What is repeated, contrasted? Where?"
"What kind of balance is evident?"

Technical Properties
(Identify medium, materials, processes)
"How was a medium used to its best effect?"
"How is use of medium better than another?"

Expressive Properties
(Respond to subject, theme, feelings or mood)
"How do combinations and organization of elements contribute to an overall mood?"
"What does the visual tell us about big ideas such as courage, freedom, war?"

Aesthetic Criticism:

Historical
Determine nature of visual within a **context**:
its style, period, school, culture
Recreative
Apprehend what the visualmaker has **expressed**
Judicial
Estimate **value** of a visual related to others:
degree of formal excellence, best use of medium/processes and overall significance

Skimming

For moving visuals with sound, "image/sound skimming" is additionally effective for helping students understand a visual experience through mental imaging after the experience is over. Richard Lacey coined the phrase in Seeing With Feeling: Film in the Classroom (Holt, 1972) and Maureen Gaffney elaborated on its applications in What to Do When the Lights Go On (Oryx, 1981).

Two questions set the stage for skimming:

"When you close your eyes
and think of the visual we just saw,
what images or pictures do you see?
What sounds do you hear?"

The editors of "Young Viewers" (Media Center for Children) recommend that "students should be reminded to think specifically and in concrete terms. Everyone should be given an opportunity to voice an image or sound without fear of being wrong. Depending on the type of visual, the student's age level, and whether activities other than discussion are planned, a series of questions can follow, not all of which apply to all visuals:

"Was there anything **special** about how
the visual looked or sounded?"
"Does the work **remind** you of anything --
a dream, book, TV, something from your life?"
"How did the work make you **feel** inside?
What was in it that made you feel that way?"
"Which **characters** would you want to be and why?"
"What do you think about the way the visual
was made or **put together**?"
"Was it easy or hard to **understand**?"
"**Why** do you think the visual was made?"
"What would you like to **change** about it?"

Conclusion

One morning last fall in my media center, a little boy clarified for me the importance of my struggling with this "Visual Education" project, in a way that was more meaningful than anything else I'd experienced in my two years of consultation, research and writing. He was seven and in the first grade, a bit of a slow learner who kept to himself and usually said little. I had just discussed with his class a "Reading Rainbow" videotaped segment we'd seen and, as the children dispersed, he indicated that he wanted to whisper something to me.

He pointed to the VCR and said quietly:

"We have one of those at home."

I said, "Yes?
That must be nice for you..."

But he went on
-- only four words,
but they chilled my heart:

"We watch scarey things."

I didn't have to read anything between the lines -- on his face was an unmistakable expression of mistrust and yes, fear, and it was directed at the VCR itself.

For us, teaching children raised on television has been hard enough over the past twenty years. And now in addition, because of video technology at home, rented or pirated movies are watched by children that they would be too young to be allowed to see in theaters. Perhaps no one at home was telling my first grader not to watch "scarey" tapes rented by and for adults in the family; apparently no one was helping him disassociate the machine itself from his anxiety.

Even though we can't control influences on children beyond the school day, we can and do influence greatly how children learn to control themselves beyond the school day. And thinking about visual information has become increasingly important as a survival skill for children in a world in which visuals themselves are changing rapidly due to new technologies. An example is my first grade student, who fears the technology he has at home right now. He may even hate it, since it has scared him.

Can he grow to understand it?
Can he learn from it?
Can he control it?
Can he value it?

Of course he can. He and I have just begun.

VCR Visual Techniques for Fifth and Sixth Graders -- More Than Turning It On!

Beth Saxton

Television uses many techniques to make messages clear and logical. If we find out how their pictures work we can understand what TV is telling us, really "see" the message and learn to make video messages that are understandable. These are the words I use when we begin to teach four lessons of video techniques to fifth and sixth graders. The we involved are the media specialist, Ann Holton, who thinks that media equipment should be in the hands of the students and the art teacher, me, who thinks that students can transfer art skills to the medium of videotape.

Our major goals are contained in those first two sentences. We want to help students become critical viewers of television, at least when they choose to be. We realize that our students are inundated in TV but may not really know very much about it. We also want the students to be able to produce video messages that communicate. Television and video will continue to be a major source of communication for our students. Those individuals who can use video to communicate clearly will be in demand professionally. We certainly don't hope to or even intend to teach students to become capable of making high quality television productions. We would like them to recognize some aspects of television production and find out if they like the process of communicating on videotape enough to pursue it again.

We are making some assumptions in planning this project. We expect that research supports the idea that students become more critical television viewers if they know production techniques. We had to limit the number and types of techniques to teach. We hope that our decisions have proved to be valid and useful for our students. We simply tried to integrate information from several sources to come up with the best model for our situation. We considered student background and familiarity with the techniques, amount of time available for instruction, ease of learning and using the techniques, the equipment available and the teacher planning and practice time available, as well as the relative importance of different production techniques.

The video lessons were designed to be team taught during media class which meets once a week for 50 minutes. Each class included 22-25 students in fifth and sixth grades. A videotape camera, recorder and monitor were necessary equipment for each class meeting time.

Individual and group practice times were held in addition to the regular class meetings. The practice times were necessary to maintain some continuity through the week until the next class meeting time and more importantly to give students hands on practice with the video equipment. The practice time provided students with an opportunity to work on their video skills and use the techniques without the pressure of making a final project.

VIDEO LESSON #1

Objectives

Discuss purposes for and scope of the video unit.
Students will learn to turn the camera on and off.
Students will learn what one shot is.

Process

"There are many ways to communicate visually; drawing, painting,sculpture, and video. If we find out how television and video messages are made, we can understand them and learn how to make them.
This unit will include four class time lessons, extra practice times after class, and time to work in small groups to produce a videotape."

Show students the video camera and any supporting equipment.
Tell them the procedure to operate it.
Be sure to label the critical attributes.
Include: Power on
  White balance
  Videotape cassette in
  Record

One shot:

- define - Turn the camera on once, off once.
- practice - Your head is the camera - your eye with one hand in front of it limiting your side vision (make a circle to look through) is the camera lens.
  Look at me - close your eyes - your camera is off
  open your eyes - your camera is on
  close your eyes - you just took one shot
  Repeat this on and off with your head in different positions.
- generalize - No matter what you're looking at, one shot is turning the camera on and turning it off.
- video examples - Show commercials taped off air. Consider meaning to the students and interest of the students when choosing commercials. The most familiar commercial to them may not be the best choice.
  Show commercial segment while students count the number of shots.
  Show a new segment and have students count silently.
  Compare number of shots counted.
  Reshow the segment and count out loud.
- written homework - Watch three different types of TV shows. Record the number of shots in one minute or less. Bring your written results to the next class.

INDIVIDUAL PRACTICE #1

Each student works alone on the video camera. A teacher must be present to give prompts, make sure the equipment is used correctly and safely and to give feedback for correct and incorrect attempts. It is much better for each student to work the equipment than for one to work it while others watch. Each student should put in the videotape cassette, turn on the power, get the equipment ready to record and record five still shots. We found that still shots are good because they limit the amount of information a student must consider and they help focus attention on the skills to be learned at this time. Frequently we needed to deal with the length of a shot and help students see that they must let a shot continue long enough for it to be seen. Right after the shots have been recorded it is important for each student to watch their own shots.

VIDEO LESSON #2

Objectives

Students will differentiate between long, medium and close-up shots.

Students will be able to explain effective uses of long, medium and close-up shots.

Students will differentiate between the camera movements of still, zoom, pan and tilt.

Process

It's helpful to recall the information students learned in the last lesson about single shots and their experiences during their individual practice times.

"We have to decide how much information to include in one shot. One way we can do that is to decide how much of the subject to include in the shot."

- define - long shot - A long shot includes every part of the subject. You can also see things that are near the subject.
- reason to use - You could use a long shot to give a lot of information about the whole subject and where it is located.
- show example with the video camera on the video monitor
- define - medium shot - A medium shot shows part of the subject. If the subject is a person a medium shot shows that person from about the waist up.
- reason to use - A medium shot is used to show importance and more details than a long shot. A medium shot is often used when two people are talking.
- show example with the video camera on the video monitor
- define - close-up shot - A close-up shows only one part of the subject. It tells us

that this one part is most important right now and that there's some detail we should be aware of.

- reason to use - A close-up can show a specific task with no distractions or it can direct attention to one important facial expression.
- show example with the video camera on the video monitor

"Another way to control the amount of information the audience sees is to make decisions about camera movements. You already know how to do still camera shots. Remember - "

- define - still shot - A still shot is one in which the camera does not move during the shot.
- reason to use - If nothing in the shot is moving, it might be best to use the still shot. It gives the audience time to see the information in a shot without distractions.
- show example with the video camera on the video monitor
- define - zoom - A way to manipulate what the audience sees is by zooming the camera lens in and out. Zooming in makes the middle of the subject get bigger and zooming out shows more of the subject and what's around it.
- reason to use - The audience can see the whole scene and then be directed to pay attention to only one part because the camera zooms in to that part. A shot could also start all the way zoomed in so the audience doesn't see all the information and then slowly zoom out to give the complete picture. This shot would build tension because the audience has to wait to understand the whole picture.
- show example with the video camera on the video monitor. Video cameras have a T and a W. Press T to tighten in on the subject and W to widen out to show more information. To get ready for a zoom you should always tighten all the way in, focus, and then widen out to where you want to start.
- define - pan - A pan is a horizontal movement of the camera.
- reason to use - It could be used to follow a person into a scene. A pan lets the audience see where things are located in relation to other things.
- show example with the video camera on the video monitor. Describe how to use the tripod knobs to accomplish the pan. When the pan is used to show a person walking, there should always be some empty space in front of the person.
- define - tilt - A tilt is a vertical movement of the camera.
- reason to use - The tilt is used to follow action or to scan an object or person. If Spiderman is climbing up the outside of a building, we can show how high he really is by starting at the bottom of the building and tilting up to him.
- show example with the video camera on the video monitor. Emphasize that the tilt must go slowly so the audience has time to figure it out. Show how to operate the equipment to do the tilt.
- practice - Your head is the camera. Show a slow pan. Show a tilt. Can you show a zoom? The explanation of why a student can't show a zoom will indicate that the idea of zoom is understood.
- written homework - Write down examples of the camera movements and the long, medium and close-up shots that you see during your TV viewing this week.

GROUP PRACTICE #2

Working in groups of three, students practice the zoom, pan and tilt. One student operates the camera while the other two are involved in the scene. Students gain practice using the video equipment and begin to have some experience moving in front of the camera and seeing themselves on videotape.

Practice situations:

Pan - One student is standing in the middle of the scene. The camera pans as another student walks up to and talks to the first student and then walks off out of the scene.

Tilt - One students sits in a chair. The other student walks up beside him/her and gently strangles him/her. The strangled student falls to the floor. The camera follows the student falling. A medium shot works well to show enough of the subject without seeing all of the murderer.

Zoom - Two students are sitting, perhaps with a book. The camera zooms in on one of them.

It is important that students have an opportunity to look at their shots right after they've been recorded. Sometimes shots will need to be done over. There is value in letting students make an error, see the mistake and have a chance to redo the shot. Sometimes more learning occurs this way than if the teacher does all the troubleshooting before the shot is recorded.

VIDEO LESSON #3

Objectives

Students will differentiate the tripod movements of handheld, truck, dolly and pedestal.

Students will distinguish between tripod movements and camera movements on the basis of feeling tone.

Students will differentiate the camera angles of high, eye-level and low.

Process

We continue the same process as before with defining each shot, telling the reason for using it and showing an example of it. For practice, students use their whole bodies to show the tripod movements. It works well to show a commercial that was shown in the first class time and have students describe the shots that they see. The commercial shows how all the fragmented information about camera shots can fit together to give a message. It also helps students realize that now they have a different way of looking at TV than they did at the beginning of this project.

GROUP PRACTICE #3

Students again work in groups of three and practice the new shots. Sometimes we ask students to come up with ideas of when they would use a particular shot and sometimes we provide them with situations to use.

VIDEO LESSON #4

Objectives

Students will see the use of a storyboard.

Students will begin to plan their videotapes.

Process

We show a storyboard that has room for pictures and written words. We model the process of changing ideas into shots on the storyboard. Students help complete a few storyboard squares. Next we model the process of using the storyboard during the shooting of the videotape. We go through two or three shots. Students need to see that we only think about one shot at a time when we're taping.

We divide the students into predetermined groups and have them begin to plan their own videotapes. We suggest that they use a nursery rhyme or very familiar story as the basis for their videotape. We give them a list of possible stories to choose from. Students may write their own original story but it is very time consuming and we encourage them to use a story they know and perhaps change the ending. It's easier for a group of students to work together if they have the common understanding of the same story to begin with.

The videotaping of each group's story happens outside of class time. At least a half hour is necessary to complete each group's work. We allow groups to reshoot their video if they are not pleased with their work. However, perfection is not the goal of this project. During this project we do not edit the videotape. We believe the time and skills necessary to edit are not appropriate for the entire class at this level.

Generally students are pleased with their work and when given a choice, are anxious to have their work included in a whole group showing. This showing is not intended to be a critique. It is a celebration.

Currently we are soliciting information in the form of a survey from students and parents about their reactions to the video project. From our standpoint as teachers it has been a successful project. Students are able to describe their television experiences on different levels; technically as well as socially and emotionally. Students uses the videotape techniques in their videotape productions. They make mistakes from time to time but their video work shows that they understand different shots and effective ways to use them.

Beyond the Three R's: A Cooperative Venture

Bruce A. Petty and Carl David Payne

In the long and diverse history of American public education, today's classroom is more sociologically complex than it has ever been. These complex environments place enormous additional responsibilities upon the shoulders of classroom teachers already charged with awesome tasks.

The contemporary teacher is expected to be a subject area content expert (often in several disciplines), skilled in the latest and most effective teaching methodologies, and an efficient manager of education resources and mandated paper work. And now the teacher must attend to informal sociological and even psychological diagnosis and counseling, not to mention awareness of legal tenants that apply to children and educational institutions. Clearly, these are difficult, sensitive issues fraught with peril. For teachers to be drawn into such extremely personal and emotional issues is to walk on very thin ice, indeed.

"Beyond the Three R's: realities, reflections, responsibilities" is a teacher education project that attempts to provide educators with the information and support they need in the decision-making processes relation to such issues. To date, two programs, have been, or are in the process of being, completed: The Latchkey Child and Substance Abuse: Alcohol.

Each program consists of two integral components. The first is a professional quality video tape which includes a "mini-documentary" segment designed to highlight the social theme of the program. This "reality" portion of the tape is, actually, a very short drama that is produced in a real Oklahoma school with actual classroom teachers and students playing the roles of teachers and students on the video tape. The "reality" segment illustrate how the program's theme might emerge in an educational setting to a point where some difficult decisions must be made by the teacher. At this point, the screen goes black to allow for the tape to be stopped for discussions.

When the workshop leader feels that discussion regarding the reality segment has been sufficient, the playing of the tape can then be resumed for the "reflections" portions to be viewed. This portion of the tape can include interviews with teachers and students who have experienced, or are experiencing, the issue at hand, or interviews with other individuals, i.e., physicians, psychologists, counselors, social service professionals, attorneys, and/or other interested parties.

Each program includes an extensive written curriculum materials package that includes flexible materials for distribution, additional information concerning the theme, suggested workshop activities, lists of additional resources related to the program issue, and an extensive bibliography to aid in further investigation.

"Beyond the Three R's" is unique in several ways. Not the least of these is the philosophy with which the development of the programs is approached. The programs are produced with the firm belief that teachers, administrators, school board members, and others are fully capable of thoughtful discussion and the planning and implementation of sound policy. Therefore, the programs do not attempt to take the "cookbook" approach and provide a "recipe" of stock answers to the problem. Clearly, there may be numerous "correct responses," and those responses should reflect the philosophies and attitudes of the school districts and communities involved as well as the regulations and laws of the state.

But, perhaps the most unique characteristic of the programs lies in the people who produced them. "Beyond the Three R's" is the result of a true professional partnership between the College of Education at Oklahoma State University and the Oklahoma Education Association. With the unqualified support of Dr. Donald Robinson, Dean of the College of Education and Ms. Kyle Dahlem, President of the OEA, the talents and abilities of many talented education professionals were brought together from the faculty of the College of Education at OSU, the offices of the foremost professional association in the State of Oklahoma, and from the classrooms of Oklahoma's public schools.

An advisory board consisting of OSU faculty, OEA personnel, and some outstanding classroom teachers from around the State was established and asked to develop ideas concerning topics to be considered and plans for implementing the programs. The advisory board, in its first meeting, generated a list of over fifty issues that they believed required attention by the teaching profession. The board then chose The Latchkey Child as the program they most wanted to see produced.

With the direction and tone of the programs being guided by this integrated group, a division of labor based upon facilities and interests was developed wherein the College of Education at OSU took the primary responsibility for producing the video tapes while the OEA assumed the primary responsibility for the development and production of the written curriculum materials package.

Yet a third remarkable element was added to this already-unique cooperative venture when an industrial giant, CONOCO, offered their video editing capabilities as a public service. It should come as no surprise to Oklahomans that, even in the face of some of the hardest times in memory for the oil and gas industry, it was still an oil company that said "yes" when Oklahoma asked.

And so the programs are being produced. The University that places more teachers in the State of Oklahoma than any other, the largest professional association for teachers in the state, and one of Oklahoma's major industries have all come together to address serious issues that affect Oklahoma's most valuable resource -- its children. And it is being done with one of the most sophisticated and pervasive technologies in contemporary society -- television.

Television has brought the world, in all its diversity and intensity, to each of us and presents us with the opportunity to deal with our world on a personal basis. It is an intimate medium; and the themes addressed in these programs are intimate, as well. The two are well-matched for delivering the message that, for education professionals and for children, there are realities and responsibilities do, indeed, extend "Beyond the Three R's."

"Beyond the Three R's" Advisory Board

Donald Robinson, Dean, College of Education, Oklahoma State University
Kyle Dahlem, President, Oklahoma Education Association

Members

Oklahoma State University

Bernard Belden
Kenneth L. King
Carl David Payne, Jr.
Bruce A. Petty
William Segall

Oklahoma Education Association

Marilyn Brickey
Charles McCauley
Nancy O'Donnell
Connie Poiry
Laura Vance
Joe Wynn

For Further Information Contact

Bruce A. Petty
Carl David Payne, Jr.
Oklahoma State University
203 Gundersen Hall
Stillwater, OK 74078
1-405-624-7124

Charles M. McCauley
Oklahoma Education Association
P.O. Box 18485
Oklahoma City, OK 73154-0001
1-800-522-8091

Dynamite Approaches to Visual Literacy: What's Happening in Pittsburgh

Barbara Seels

During a typical week in Pittsburgh public schools students will use logo to illustrate their stories and develop skills in interpreting visual evidence. During the same week their teachers will meet to develop exercises that can be used for both assessment and instruction in the visual areas and to attend an in-service workshop on using museum resources. While the teachers are meeting, education students at the university will discuss aesthetic criteria as applied to the design of classroom environments and research the effect of stimuli variations on visual learning. Throughout the week there will be attention at all levels to the interdisciplinary development of visual skills, to the use of visuals for critical thinking and problem solving, to the interdependence of assessment and instruction and to interaction with community resources.

Many picture Pittsburgh as old buildings, dirty rivers, smokey skies and steel mills. These images are out-dated stereotypes. The arts pervade the community from murals in hospitals to groups dedicated to keeping alive the crafts of their native culture. The schools reflect the community's involvement with art. Activities and projects from the Pittsburgh Public Schools and the University of Pittsburgh School of Education exemplify ways to make the development of visual abilities central to education. The focus of this paper will be on unique efforts to raise teachers' visual awareness and skills and to produce visually-literate graduates of a city school system.

First, a few statistics to set the context. About 420,000 people live in the city of Pittsburgh and about 2.2 million in the urban region surrounding the city. In the 1985 Places Rated Almanac the city was ranked seventh in education and twelfth in the arts. There are about 80 public school districts in the urban region serving over 300,000 students.

The largest district is the city school district which offers programs for 40,000 students at 79 sites. Although these schools are contained within an area about 20 miles square, there are many geographical features such as the hollows, hills and rivers, which help each school retain its uniqueness while district-wide standards are being achieved. The district employs 6,000 and has a general budget of 268 million. Many special programs are offered: gifted programs, vocational training in 45 career areas, 19 magnet school programs, full and half-day kindergarten, integrated arts education, centers for musically talented, English as a second language and adult basic education. There are 47 elementary schools, 14 middle schools, 11 high schools, and 7 centers including special education and scholar centers as well as alternative high schools. The schools are fully integrated with a student population approximately 52% black, 46% white, and 2% other. There are also two teacher centers in operation with a third to commence soon.

Under the leadership of Dr. Richard C. Wallace, Jr., Superintendent, an extensive staff development effort has been implemented along with a plan for continuously assessing achievement. Efforts in visual literacy fit into the districts overall plan for improving the schools. To understand how you need to be familiar with the school district's Excellence Program.

The Excellence Program was adopted in 1981 with three improvement goals: student achievement, classroom instruction and staff evaluation. Later, the student achievement goal was focused on the areas of reading, science, mathematics, and at-risk students. Before the program was adopted a needs assessment was conducted throughout the community and the Allegheny Conference on Community Development placed schools on the city's agenda. Since 1981 private grants have provided 2.5 million for the Excellence Program. Over 30 foundations have supported the major program thrusts: Monitoring Achievement in Pittsburgh (MAP), Pittsburgh-Based Instructional Supervisory Models (PRISM), School Improvement Program (SIP), the Teacher Centers, the Science Institute, and the Pittsburgh Critical Thinking Program. The results of the Excellence Program have been:

1. In 1981, 22 of 55 elementary schools were performing below national norms. In 1986 all elementary schools performed above national norms in academic achievement.
2. In 1981 8 middle schools were performing below national norms. In 1986 they all performed above national norms in academic achievement.
3. The student dropout rate is down to 26% from 35% 10 years ago.
4. Two high schools have been recognized nationally as outstanding schools, Schenley by the U.S. Department of Education and Taylor Alderdice by Town and Country Magazine.
5. Instead of a projected decline student enrollment is increasing due to transfers from private schools.

The school district encourages co-teaching or cooperation between teachers in course development and delivery. For example, at Brookline Elementary School Barry Stephens, an art teacher and Marge Linguist, a history and geography teacher, integrate art and social studies in order to help students understand critical thinking. Students in their classes complete team exercises with objects and photographs in order to develop historical research skills and inferential skills. They began to co-teach when Marge asked for help with contour maps and Barry taught about concentric shapes and complementary color schemes. Their students know when more evidence is needed to support a conclusion because they are used to describing and inferring from pictorial clues. They know what an environment is and how to use it to reach conclusions. The teachers work on team skills, then on focusing and finally on questioning.

There is at least one visual arts specialist in each elementary school in the city. There are two arts supervisors in the Division of Arts Education. Here is a sampling of visual literacy efforts underway in the Pittsburgh Public Schools. They are labeled as to mission of project: instruction or assessment.

MAP Art (assessment)

The Monitoring Achievement in Pittsburgh (MAP) Project links the curriculum with assessment. The MAP curriculum is a series of instructional objectives for each grade and subject which are periodically measured through specially designed tests. The data collected are used for planning. It's an effort to standardize instruction across the district that so far includes mathematics, writing and speaking, reading, social studies, and science. MAP Music is being developed.

Teachers are now meeting to discuss extending the MAP Program to arts. Initial efforts yielded 20 objectives for elementary art which meets one period a week and 3 objectives for upper grade arts which meet more than once a week. Currently, teachers are trying to determine how to resolve issues such as the relationship of teaching time to number and type of objective.

TELLS Art (assessment)

Pennsylvania has a statewide assessment program called Tests of Essential Learning and Literacy Skills. The tests are designed to identify reading and mathematics problems early on and make tutoring available at state expense where needed. All third, fifth and eighth graders take the test. The objectives are published and comparative data for districts is available. The purpose of TELLS Art is to use art as a resource to better understand science, math and reading.

Presently, art teachers offer Saturday instruction in math and reading related art. For example, one TELLS objective is "Given a pair of lines, identifies the best name of the relationship between the lines (intersecting, parallel or perpendicular). The art classes will approach geometric lines and shapes in many ways in order to provide the student with a better basis for mathematical concepts. The students will make tanagrams, geometric designs, fold 3D geometric shapes out of felt paper and use gridsheets. They will tessellate a plane, that is cover a surface with patterns of shapes with no gaps and overlapping. They will tie dye or print their tessellation. They will do creative designs within shapes such as circles and discuss how you pack a lot in a space. They will discuss symmetry patterns.

To relate to reading, stories are told with designs. They force word combinations to create new images. Word association drawings are used as are storyboards. The teachers urge all students to become "Tellstars."

Project Arts Propel (instruction and assessment)

The Rockefeller Foundation has funded a project to assess learning in the arts: visual arts, music and imaginative writing. Arts Propel is a cooperative project with the Graduate School of Education at Harvard University and Educational Testing Service (ETS) to build exercises to incorporate into portfolios which will be the basis for assessing students' work. The project is in its preliminary stages and has three aspects: perception, production and reflection in the visual arts, music and imaginative writings. With the assistance of students from various schools in the district, twenty city teachers and administrators are participating by explaining approaches to teaching and assessment, developing exercises and trying them out. One important question being asked is how work in the arts is related to critical thinking. Year one was an exploratory year with four teachers involved from each area. Year two is for exploration and implementation with eight teachers participating from each area. Teachers work in collaboration with Dennis Wolf and Howard Gardner of Project Zero and Drew Gitoner of Educational Testing Service.

It is becoming clear from the efforts so far that the critiquing process is important to the development of visual abilities. For example, in the Grid Design Exercise students conclude a lesson on the creation of a color pattern using a grid by discussing the effects of one color in relationship to another and the effects of various designs working together. They will ask themselves "Do my designs fit like a puzzle?", and "Are my color choices successful?" The intent of the portfolio approach is to reveal to a student whether his third or fifth version of a painting is best and why.

Pittsburgh Critical Thinking Program (instruction)

This project has as its goal the cultivation of higher level thinking skills. The goal is to help secondary students develop the ability to express themselves logically in oral form. The program is an adaptation of the St. Johns University secondary education model. Excerpts from great books are discussed in a group following strict rules of procedure. The one to two page excerpts are classics from many subject areas such as mathematics, philosophy, government, art, science, morality. A number of administrators in the district have been concerned with the limited perspective of primarily male writers who are Western European traditionalists.

In the Pittsburgh model, students in selected pilot schools spent 45 minutes a week in this discussion mode. The rules required the student to stick to the text, back up statements, build on others' ideas, strive for understanding, limit participation and question points. Stick to the text means not bringing in outside information that might intimidate others by expertise.

The text excerpts are available in two volumes, Touchstones I and II. Touchstones II contains two art reproductions, one amplifies the text and the other is the text. The first is Melancholia I by Albrecht Dürer which accompanies an excerpt from The Anatomy of Melancholy. The second is The Mill by Rembrandt.

Phase One of the project was to focus on training the students in the process and Phase Two was to be a content-based process of discussion. For Phase Two the project was to use text from the areas of English, Social Studies, and Arts as a basis for discussion. An Arts Committee comprised of teachers and supervisors met to formulate an adaptation for music, art, media, theatre and dance. It was decided that participants would view or listen to selections from the arts and then discuss them and that these selections would be artistic and aesthetic experiences integrated with other content areas.

The purpose was to promote visual literacy and perception by asking the student to carefully and critically confront a work of art, develop a vocabulary to discuss visual phenomena, to generate questions about possible meanings of a visual statement and to refer to the work to support ideas and opinions. The committee developed guidelines for characteristics of art work to be used as text materials, such as "should be non-controversial so that strongly felt issues would not create debate rather than encourage cooperative learning" and "should encourage interdisciplinary reflections."

Each discussion group has a leader. The leader's role is critical. After the opening question the leader should participate only if the students are actively involved in discussion. If the discussion is proceeding the leader can assume one of three roles. He or she can remain silent or ask probing questions or act as a manager by recognizing speakers and eliciting responses.

Dr. Richard C. Wallace, Jr., has expressed the district's commitment to critical thinking; "Critical thinking, the ability to speak to an issue, perceive and express relationships among phenomena, orally and in writing, is the hallmark of an educated person." Despite the district's commitment, problems have arisen with the critical thinking project as implemented in the arts area. The goal was to broaden discussion by basing it on more than written work -- on artworks, music, theatre or dance. It was also to encourage students to talk in an area where they are not usually asked to speak: visual and audio literacy. Often the rules have been difficult to enforce consistently because students want to move away from the work of art to talk about themselves. The time taken from some content areas is being contested. Eventually the art excerpts are to be integrated in content areas but that hasn't happened yet. Students have expressed the need for more current and concrete text materials to help them relate to the topics better. Teachers are currently exploring ways to use video segments as text excerpts. They have developed procedures for selecting and using video sequences from MTV and arts performances.

Computer-Related Art (elementary instruction)

The district wanted to encourage computer literacy for all elementary students; therefore, when computer requests began to proliferate in the schools a decision was made to place the computers in the art rooms rather than the math-science areas as is usual. LOGO was once under the direction of the Office of Computers in Education, but now it is placed in the arts curriculum area. It is not unusual in Pittsburgh for the art teacher to have a bank of computers in her classroom or for the art teacher to supervise the school's computer lab. The initial team to develop instruction in computers at a school was the librarian and the art teacher. The administration wanted to eliminate the perception that you have to be good at math to use computers.

The district has developed a series of workbooks and discs for exercises in Logo as related to art. At Brookline Elementary School art teacher Nancy Fralic teaches logo to grades K-5. As the students progress, they are scheduled for more time with her. Her logo lessons help develop critical thinking skills related to giving directions. Current plans call for the math and art departments to meet to develop closer instructional ties. A problem that has arisen are art teachers' perceptions of the need for non-art prerequisites. One finding has been that two students at a computer fosters team skills. The Superlogo project is funded by the USOE under the Education and Consolidation Improvement Act of 1981.

Nancy Fralic treats the computer as a tool for preciseness in art. Her fifth grade students have placed regionally in the Buhl Computer Fair. Using the Storyteller program, one of her students created this:

Long Shot of street.	Our story begins on Long Street.
Medium Shot of statue with spider on it.	Ms. Spider sees many things from her web.
Close Up of web being spun.	
Hulk Hogan working out in gym.	Ms. Spider sees Hulk Hogan working out at his gym.
Geometric pattern of frog hopping.	She sees Mr. Frog hopping home on a dark black night.

The student used Storyteller software with a doodle subroutine on Tandy equipment.

At Banksville Middle School Scholar Center, a gifted program, Bill Perry is a master art teacher. His classroom includes a row of Apple Computers, an optical scanner and a digitizing camera. Students develop a theme and then a story including a number of themes. The storyboard and visuals can be done on the computers. The computer is then used to create images. Images are also transferred via the optical scanner. The images are then recorded in final sequence on videotape. Mr. Perry also includes in his classes discussions involving aesthetics, art principles and art history as well as time on a traditional media. The traditional media might be string sculpture. His art history lecture might pose the question when did art begin? He might stimulate discussion on types of visual evidence. His objective is to maintain individuality within art and computer objectives.

In-Service Education (instruction)

The school district has an agreement with the teachers' union to provide compensatory pay on an hourly basis for overtime spent on in-service. The most common approaches to in-service are 1/2 day on school time by grade level or geographic cluster and after school or Saturday. The teachers involved in TELLS art training, for example, are paid $14.35 an hour on Saturday. Teachers attend on an overtime basis voluntarily. The time may be spent in planning special projects or meeting the immediate needs of the teacher, i.e. designing lessons for new texts, personalizing instruction, planning an arts history curriculum or using the PRISM model. The contract also allows for nonpaid in-service on a voluntary basis. Teachers can obtain increment credit for salary schedule advance by attending in-service courses approved by the Board of Education. Fifteen hours of in-service give one increment credit.

The in-service programs offered vary in theme from year to year. They are tied to current events and the community. This year's in-service for Visual Arts Specialists was on drawing and was tied to the "Old Masters Drawings from Chatsworth" exhibit on loan to Pittsburgh this fall.

The exhibition is a collection of 124 well-preserved drawings from the masters of the 16th and 17th centuries. The preparatory sketches and finished products include landscapes, portraits, and caricatures. These are sketches of cherubs, nymphs, popes, madonnas, baptisms, assumptions, crucifixions, emperors, gods and goddesses. The masters include DaVinci, Rubens, Rembrandt, Titian and Van Dyck. A collaboration of arts organizations was formed to relate other art events to the Chatsworth exhibit. Eighteen other cultural institutions and commercial galleries hosted historical and contemporary exhibitions of drawings and related works. The collaboration was called "Drawing on the Pittsburgh Connection," and included exhibits of "Drawings from the Eighties," "Drawn to the Surface," (clay and glass), and "Animals, An Artistic Affair."

The school district offered a series of workshops for teachers culminating with a day at the Frick Museum, where the exhibit was showing. During the day the teachers tried out suggested activities such as Scavenger Hunts, Point of View/Zoom In Zoom Out, The Selective Eye, Questioning to Promote Critical Thinking, Live Dictionary, Connoisseurship--The Art of Collecting, Taking a Closer Look. They tried two partner games: Details, Details, Details and Every Picture Tells a Story. These activities were developed by Susan Donley, the workshop leader. The inservice was for art teachers, who are expected not only to use the strategies in their teaching, but to help diffuse the ideas to elementary teachers. It is hoped that eventually a young masters' exhibition will occur in most buildings. The exhibit, the in-service program and a reception were funded by the Henry C. Frick Educational Commission and the Frick Foundation.

Teacher Centers

The other opportunity for in-service in visual literacy areas is the teacher centers. When it was determined that the average city teacher had 18-25 years of service, a need for staff renewal was identified. To provide a way for teachers to improve and update their skills a teacher center for each level, elementary, middle and secondary, was conceived over a four-year period. Each center would cycle all the teachers at a level through a 5-8 week renewal opportunity. It was the first staff development program of its type in the nation. The centers also came to assume other functions such as continuing in-service and project management. During their renewal period teachers are trained in the PRISM technique (Madeline Hunter's approach), update content knowledge, observe effective teaching, practice new techniques, conduct research or special projects, do site visits or take part in externships with businesses or schools. The high school teacher center, Schenley High School, has completed rotation of all teachers; the elementary teacher center, Brookline Elementary School, has rotated about half the teachers. The middle school center, Greenway Middle School, will commence soon. The teacher centers serve to help diffuse and promote ideas. For example, a teacher can decide to develop a slide collection on design elements during his time at the center and can visit other teachers concurrently and share ideas. Another project might be to develop art history units. Schenley High School Teacher Center and the PRISM Staff Development Program at Brookline Elementary Teaching Center have been given national awards for excellence.

Magnet Schools (instruction)

Special programs related to visual literacy are offered at some schools. Students are accepted into the Rogers Middle School for the Creative and Performing Arts and the Pittsburgh High School for the Creative and Performing Arts (CAPA) based on a portfolio or an audition. These magnet schools are for talented students who want to study the arts. Instruction is offered in academic subjects plus instrumental and vocal music, dance, movement, drama, visual arts and media arts.

Gifted Education

The district has a pull-out program for gifted scholars. At the Middle School level students are rotated on a one day basis through Banksville Gifted School. While at the school they take elective courses in art, music, and media. The school also has an artist-in-residence. The art teachers Josephine Catanzaro and Bill Perry incorporate art history and style periods in lessons. The music teacher, John Pruszynski, allows students to develop record albums and commercials for the albums. Each year an exhibition of creative products from the gifted programs is held at Carnegie Mellon University.

Community Involvement (instruction)

A local private school has fostered community involvement throughout the schools by publishing a best seller, a book on places in the Pittsburgh environment where kids can go and look. It's called Pittsburgh for Kids and is used frequently by teachers as a field trip source.

There are many ways in which the district fosters community involvement. At Banksville Gifted School Russell Silver, an art teacher, sends student teams to each geographical area (N, S, E, W) to document with stills and videotape the characteristics of the neighborhood and its schools.

An all city art exhibit will be held at Manchester Craftsman's Guild and an art teachers' exhibit will be held at Courthouse Gallery. Mentally retarded students can enter the Association for Retarded Citizens exhibit held in PPG Wintergarden. Each year the district has averaged 3 of the 12 national winners in the ARC Exhibit and calendar competition. An exhibit at a Homestead school included variations on the local landscape.

Students at Southside Vocational help support the art program by painting store windows at Christmas. They design school T-shirts and hats. They submit proposals for banner designs to the Three Rivers Arts Festival. If their proposal is accepted the festival provides the materials so they can make the banner for the exhibit. They instruct visiting kindergarten pupils in art during a day long visit to the school. They publicize Youth Arts Month and paint wall murals in the community.

Another type of outreach program are the collaborative programs with museums such as the Carnegie Museum of Art and the Pittsburgh Children's Museum. Every elementary child in fifth grade goes on an Art Smart Tour. In the Art Express Program the museum staff works in schools. Then each year twelve of the schools send their fourth or fifth graders to visit the museum.

The Art and Academic Program offered with the museums provides for an interdisciplinary offering. The school decides whether it wants to link art with social studies or science through a topic such as medieval life. The museum staff may help students research and create a castle.

Exhibits from other schools are sponsored. Last year the Wuhan China Art Exchange exhibit toured the schools in Pittsburgh.

Community involvement is also offered through cooperative arrangements with organizations such as the History and Landmarks Foundation. Their Educational Resources Division helps in many ways through: sponsored history and architecture tours; slide shows and lectures on topics such as "Architectural Styles of Western Pennsylvania;" curriculum guides such as "Hands-on History: An Introduction to Classroom Methods for Local History Research Course Manual;" and touring exhibits such as "Architecture the Building Art." In addition, two popular programs are sponsored by the Foundation: the Hands-On History Education Fair and Student/Teacher Workshops. The History Fair is held in a central location such as the courthouse or the new Center for the Performing Arts or Heinz Hall. Over 1,000 people view group projects and presentations from the schools on topics such as a photo display of an ethnic neighborhood or a videotape depicting the social history of the 1960's or second graders' studies of geometric shapes in architecture. Students and teachers can elect to register for workshops that offer inservice credits. Workshops are offered on: Hands-On History, Exploring Your City, Pittsburgh Heritage, Exploring Your Neighborhood, and Exploring Architecture. Fees for the workshops range from $15. to $115. County students can participate in the Arts and

Humanities Apprenticeship Program. A student in this program might do an architectural or arts career information internship.

Funding Sources

A teacher may have a special project to implement such as mask making and finds funds for the project are inadequate. If so, he or she can apply to the ARTSGRANTS Program sponsored by the Pittsburgh Fund for Arts Education. The fund allows up to $700. for art related projects in the schools. Funds can be used for materials or services. Teachers are encouraged to trade supplies and to use community resources.

These foundations have provided support for school efforts in the Excellence Program: Aetna, Alcoa, Atlantic Richfield, Bell of Pennsylvania, Benedum, Carnegie, Annie E. Casey, Conrad Hilton, Ford, Frick, Heinz, Hillman, Jennings, Matsushita, Mellon, Pittsburgh, Pittsburgh National, PPG Industries, R. K. Mellon, Rockefeller, Rockwell International, Staunton Fam, Snyder, Charitable Trust, Westinghouse Electric Corporation. That's what's happening in the schools. We'd like to tell you what's happening in higher education too.

The Department of Learning and Instruction in the School of Education at the University of Pittsburgh has 84 faculty and 1800 students. Three hundred of those students are in the teacher development component. Efforts in visual literacy and learning fall into three categories: courses, research, and in-service. The faculty most associated with these efforts are: Barbara Seels, Barbara Fredette, Don Mushalko, and Larry Knolle. These activities have occurred over a period of fifteen years.

The first component is courses available for graduate students in the School of Education. Courses related to visual literacy include: Psychology and Media, Visual Thinking and Learning, Museums as an Educational Resource, Learning Styles, and The Uses of Visual Imagery in Thinking and Learning. The Psychology and Media course deals with research on visual learning. The Visual Thinking and Learning course covers theory and practice in visual thinking and visual literacy programs in the schools. The Museum as an Educational Resource teaches how to use the museum to develop visual literacy skills in students. The Learning Styles course covers right brain/left brain theory and its implications for education. In The Uses of Visual Imagery course students focus on levels of meaning and aesthetic and instructional dimensions of images. They must practice visually mediating approaches to teaching.

The next component of the visual literacy thrust is research. Students are encouraged to undertake theses and dissertations in a visual literacy area. So far these studies have included several dissertations on visual learning and several on curriculum implications. Some of the titles are: The Effect of Color Mode and Leveling--Sharpening Cognitive Style on Pictorial Recognition Memory (Soofi Gabriyal), Qualitative Analysis of a Prototype Program for Increasing Visual Process Skills (Joanne Dunn), Pictorial and Verbal Short Term Recall of Nursing Students under Intentional and Incidental Conditions (Ann Lyness), Recognition and

Comprehension of Abstract Pictorial Representations: Comparisons Between Eighth Grade Thai and American Students (Suwattaner Sugg), A Planned Program for Elementary School Children that Utilizes Visual Thinking Skills for Problem Solving (Kathryn Brady Duerr), The Interactive Effects of Color and Cognitive Style on a Pictorial Recognition Task (Theodora J. Wiekowski). In addition, the faculty has done research through sabbaticals and grants in the areas of critical viewing skills, curriculum for visual literacy and museums as a resource.

The third component is in-service at the university. Dr. Betty Edwards has conducted a two day workshop. Faculty have been offered 2 hour seminars on right brain/left brain research from speakers such as J. E. Bogen, a cerebral asymmetry researcher.

What have we learned from these visual literacy activities in public and higher education? The more one deals with the development of visual abilities the more questions of assessment arise. Curriculum and ways of assessing learning in the arts cannot be separated. Janet Waanders describes this as blurring the line between teaching and testing by using instruction-based assessment such as computerized adaptive tests in which the test is adjusted to the student's responses. Moreover, the teaching/learning process must be consistent with assessment strategies. Students in the visual thinking and learning course are graded on their risk, effort and growth as demonstrated by elaboration, fluency and uniqueness.

Secondly, visual literacy assumes more importance as it is integrated with life, other subjects and the community. There is a need to show the relationship of visual skills to basic skills.

If you would like more information on any of these projects, here are the people to contact: (The addresses are all for Pittsburgh, PA.)

Pittsburgh Public Schools	Division of Information Services 341 South Bellefield (15213)
Co-teaching Social Studies and Art	Mr. Barry Stephens Brookline Elementary School 500 Woodbourne Avenue (15226)
MAP art, Project Propel	Dr. Laura Magee Director, Arts Education 850 Boggs Avenue (15211)
TELLS art, Pittsburgh Critical Thinking Program	Ms. Karen Price Visual Arts Specialist Schenley High School Teacher Center Bigelow Blvd/Center (15213)

Computer-related Instruction	Ms. Nancy Fralic Visual Arts Specialist Brookline Elementary School 500 Woodbourne Ave. (15226)
Museum Resources	Dr. Vicki Clark The Carnegie 4400 Forbes Ave. (15213)
In-Service Education, Museum Programs	Dr. Julianne Agar Supervisor, Visual Arts 850 Boggs Avenue (15211)
Banksville Gifted School	Ms. Mary Walsh 3550 Banksville Road (15216)
Southside Vocational School, Project Propel	Ms. Barbara Albig Visual Arts Specialist South Vo-Tech 930 Carson Street (15203)
History and Landmarks Foundation	450 The Landmarks Building One Station Square Pittsburgh, PA 15214
Visual Thinking and Learning, Psychology and Media	Dr. Barbara Seels Associate Professor 4A16 Forbes Quadrangle (15260)
Theory of Image Museum as an Educational Resource	Dr. Barbara Fredette Associate Professor 4C21 Forbes Quadrangle (15260)
Learning Styles	Dr. Larry Knolle Associate Professor 4C20 Forbes Quadrangle (15260)

References

Boyer, Richard and Savageau, David. (1985). Places Rated Almanac. Rand McNally and Company

Downing, Kathy. (1978). Pittsburgh for Kids. McEwan Open School.

Gitoner , Drew. (1987). "Team Develops Exercise and Portfolio to Help Teachers Assess Learning in the Arts". ETS Developments, V. 33, No. 1. ETS.

"History and Landmarks: Resources for Education". A Publication of the Pittsburgh History and Landmarks Foundation.

"Portfolio: The Newsletter of Arts PROPEL," V. I, No. 1, Feb. 23, 1987. Harvard Project Zero.

Waanders, Janet. (Sept.-Oct. 1986). "The Art of Assessment". Design for Arts in Education.

Cable Television -- Public Schools -- Visual Literacy

Lesley Johnson

It seems I've been doing cable forever, but in reality it has been since July, 1981. One summer day, the Superintendent of the Marblehead Public Schools, Dr. James Kent, asked me if I would join him for a meeting with a representative from Continental Cablevision. The company was beginning to "feel out" the Town's interest in franchising for cable television. The three of us met and discussed the vagaries of cable technology and education. As a former high school English teacher, I had always been excited about the potential of video in the classroom. Now I was extremely excited and felt that my plans and hopes for educational television would soon be a reality in Marblehead. The Superintendent was more cautious, and after our meeting ended and the two of us were quietly sitting in his office, he turned and asked "Lesley, do we need this?" Without hesitation I answered "Yes." That was six and a half years ago. Subsequently, I have learned much about the problems and strategies involved in integrating cable technology into our school system. It is this accumulated experience that I now share with you.

Philip Miller's informative NESDEC presentation "Cable Television and the Schools" (Miller, 1982) summarized the steps to be taken by school systems wishing cable services: "Organizing an effective school cable service often involves a series of difficult struggles. First, there is the franchising battle to be fought. In many communities, the school system must fight for representation on the local cable negotiating committee or advisory board and for the inclusion of franchise provisions that address the schools' real needs. Then, after the franchising battle has been won, the school system must monitor the system-building process, to make sure that the cable company doesn't neglect the schools as it completes contruction that promises more immediate revenues. Additionally, after the franchise contract is safely sealed, the school system must turn its attention toward the importent and arduous task of organizing the schools and community for educational cable service. In fact, given how much hard work it takes to get a good school cable service going, schools that are about to enter the battle should probably pause to ask if educational cable is really worth fighting for."

To determine whether the struggle for cable will be worth it, one should look at the various benefits discussed in "Cable Television in the Schools: A Resource

Document" published by the Massachusetts School Superintendents' Association and the Massachusetts Department of Education. These include:

1. A distribution service that can provide teachers with instructional T.V. (ITV) programming at times tailored to meet individual scheduling needs. This includes hook-ins to the home subscribership and delivering programming to parents and home-bound students.

2. TV studio (in school) and training facilities to establish or expand a curriculum in TV production, starting in upper elementary grades.

3. A means of distributing teacher training and in-service workshops to a widespread group of teachers via an institutional loop.

4. A means of distributing adult and community education courses to home viewers (some courses can be produced by students).

5. A means of distributing school-produced video programs to home and schools and, in doing so, publicize(ing) school activities.

6. A data network service that interconnects microcuputers used for classroom instructions.
7. A data network service that interconnects administrative computer and word processing equipment. (June, 1983)

Once the question has been answered, you need to develop a series of strategies to guide you successfully through the three major phases in the development and growth of a cable system:

I. PRE-CABLE : FRANCHISING AND READINESS. As many towns do, your town will begin the process by appointing a study committee to determine whether cable can become a reality. From this emerges an advisory board which completes the franchising process in the community's best interest. A school representative shoud participate in the franchising and the construction process to ensure that the school system's interests are protected. No one will do this for the schools so I stress participation in the process right from the start. There are a number of ingredients necessary to make the entry into cable a success. Here are a few that are very succinctly outlined in the booklet previously cited.

POSITIVE ATTITUDE AND COMMITMENT TOWARD CABLE

The most sophisticated equipment and highly-funded educational cable system in the world will fail if there is little or no commitment and enthusiasm from those involved. CABLE WILL SUCCEED ONLY IF YOU AND OTHER KEY PEOPLE BELIEVE IN ITS VALUE.

STAFF AND STAFF TRAINING

Although many of the newer cable systems do provide educational liaison personnel, you should create your own group of trained cable advisors. This educational cable committee can represent the needs of teachers and train other staff. Appoint one such member to be the Educational Cable Coordinator (E.C.C.) someone with a background in cable technology and, equally important, the ability to communicate his or her knowledge to the community and governing body of your town. This person is a logical choice as school representative on the Cable Advisory Board, should one be formed. Allow him/her the TIME and FREEDOM to develop a comprehensive plan for cable use in the schools, to gather technical information and make valuable contacts in the community. One of my functions in Marblehead is to serve as the Cable Coordinator. I can not stress enough the need for time and flexibility to participate in the franchising process, to guide the curriculum development, oversee school/cable construction, write for training grants, and on and on. It is vital that someone with a commitment to the technology represent the schools throughout the life of cable in the system!

TIME

It takes time for cable to prove itself. The advantages of cable do not prove themselves overnight. Years of hard work are needed to put an effective school cable operation in full swing. Time is needed not only for educating school personnel, but also for meeting with community groups to develop a vital partnership.

PARTNERSHIP

A partnership must be developed with local businesses, civic groups, the State Department of Education, parents, etc. Don't struggle to develop cable in a vacuum when your community may contain groups and individuals with extensive expertise and/or enthusiasm about cable. The cable company will not promote this networking. You must go out and do it.

FUNDING

Funding is an obviously vital ingredient in cable's success. The franchise agreement may stipulate that the cable operator will provide certain equipment and programming for the schools, but, whether the operator does or doesn't, you need to seek additional sources of support to broaden your funding base.

ADMINISTRATION

Schools that organize their own structure for governing educational cable generally experience more success than those leaving these matters to the cable operator. In Marblehead, the Superintendent has been designated as the school representative to the Cable Television Oversight Committee while in my position as Media Director, I serve as the school system's liaison.

EQUIPMENT AND SPACE TO HOUSE IT

> A functioning cable system requires equipment above and beyond most school system's normal inventory. For playback, extra monitors and playback video decks are needed; production entails the use of cameras, a switcher, editor and editing decks, lighting gear, etc. Much of this equipment can and will be supplied by the cable operator if you write this into the franchise agreement, though normally, the schools are expected to bear some equipment costs. PUSH FOR AN IN-SCHOOL STUDIO IN THE FRANCHISE AGREEMENT. If such a studio is not feasible, the next best system is a school-based head-end for the institutiional loop which allows for distribution of programs from a central playback unit. Of course, cable takes up the least amount of space in schools that only receive programming from outside and do not produce local programs; all this arrangement requires is a drop in the classroom.

PROGRAMMING

> Obviously, a system without decent programs is a waste. It is vital that program content be discussed and agreed upon early in the process, even before the cable is installed. Don't find yourself in the "we've bought the equipment, now what do we do with it?" trap, one experienced commonly in the area of microcomputers.
>
> (M.A.S.S. & D.O.E., 1983, passim)

Having determined where your system stands on these "Success Ingredients" the next step in your pre-cable strategy should be to complete a K-12 needs assessment of cable services and present these guidelines to the advisory committee for inclusion in its final report to the franchising companies. Here are thed results of the needs assessment that was completed two years before our license award..

> In keeping with the guidelines set up by the Massachusetts Department of Education, it is recommended that any cable franchise granted include:
>
> A. The cable company chosen be one with experience in
>
> 1. producing original educational programming with/for local school systems;
>
> 2. delivering pre-produced programming to schools and helping tailor this to in-house school instruction;
>
> 3. using cable to disseminate school district information;
>
> 4. supporting educational radio service over cable.
>
> B. The cable franchise granted include provision for
>
> 1. carrying public broadcasting stations such as C-Span and the American Educationl Television Network;

2. additional educational programming services as they become available via satellite, microwave or other type of signal delivery system arranged by MET or other appropriate program providers;

3. technical and production training to students and school personnel;

4. specific funding or budget percentage arrangements to develop and/or acquire educational and instructional programming;

5. specific allocation of such funds on a single or periodic basis;

6 availability of full-time staff assistance, other than locally budgeted assistance, to support the development of educaitonal channels on the home subscriber system;

7. a negotiable number of educational channels on the home subscriber system;

8. availability of educational access channels on the least expensive home subscriber tier;

9. active assistance in providing, scheduling and transmitting programs for educational access channels;

10. a network which interconnects all schools within the system, including multiple drops per school to be so designated.

11. a fixed-location color television studio in the high school as part of a curriculum development commitment to be designed and negotiated in cooperation with school personnel sharing the facility.

12. a negotiable number of channels permanently reserved in the institutional network for school use;

13. educational use priority during school hours;

14. a negotiable number of modulators, permanent and portable, available for school use;

15. data transmission over the institutional network. maintenance, replacement, and insurance of this equipment with funds made specifically available by the cable company;

16. connection to cable systems in neighboring communities;

17. connecting schools to any security and energy management services the cable company offers;

18. a specific timetable for completion of negotiated facilities and resources.
(M.A.S.S. & D.O.E., 1983, passim)

Three years later, July, 1984, the town's Issuing Authority Report was delivered to the competing cable companies and included section XIV, which is inserted for you use:

XIV. MUNICIPAL COOPERATION WITH LICENSEE

Coordination of Municipally-Sponsored Activities:
Education and the Schools:

The Issuing Authority believes that cable television could provide a number of significant services to Marblehead students, including production and cablecast journalism training, involvement in local origination and public access programming to meet both community and educational curriculum needs, better access to educationally and locally produced educational and cultural televisiion programs, and closer ties with other institutional organizations in Marblehead and in neighboring communities.

The school system has already begun to teach a mastery of the medium with introductory equipment instruciton at the K-12 level, media courses through the English and instructional resources departments at the high school, and media training electives at the middle school.

Being part of an interactive institutional network would allow each school to serve as an origination point for programming transmitted to other schools and to the community at large. Classroom instruction and other information vital to school operations or of parental interest would become broadly available through an educational access channel, and data could be transmitted daily and efficiently to and from central computer facilities. Finally, a whole new network of communciation could be opened both within the school system itslef and between the schools and the rest of the community, expanding educaitonal possibilities and community involvement in educational programs.

In responding to the Issuing Authority Report, applicants should describe as explicitly as possible how the system they propose for Marblehead would help the school department fulfill the goals and objectives outlined in Appendix XIV.A.

The Issuing Authority is interested in a complete description of any experience which the applicants may have had with respect to educational programming that might help the Issuing Authoriyt judge how well the applicant will help serve Marblehead's educational needs. Specifically, the applicants should cite, if applicable, one or more recent specific examples in Massachusetts that demonstrate its success in:

a) training students and teachers in the technical and production aspects of cable television;

b) producing origninal educational programming with/for local shcool systems;

c)delivering student-produced programming to schools and helping to tailor this to in-house school instruction;

d) using cable to disseminate school district information.

During the franchising process, we wrote our goals for the K-12 system and used these as a focus throughout the pre-cable phase. Our goals are as follows:

MARBLEHEAD PUBLIC SCHOOLS

GOALS FOR CABLE T.V. USE

OVERALL GOAL: TO INTEGRATE THE USE OF CABLE TELEVISION INTO THE PROCESS OF EDUCATION IN MARBLEHEAD

GOAL 1. TO PROVIDE QUALITY INSTRUCTIONAL PROGRAMMING TO STUDENTS AND STAFF.

Objectives:

1. To distribute selected videotapes and discs at places and times convenient to classroom teachers.

2. To enable teachers to demonstrate effective teaching techniques in actual classroom situations by using the institutional trunk.

3. To receive and use network programs, documentaries and national ETV services available through the cable home network.

4. To exchange educational programming and information with nearby communities.

5. To distribute instructional sessions to homes for the purposes of tutoring and/or stimulating student/parent discussions about curriculum content.

6. To take advantage of two-way television as it becomes available.

7. To provide in-service training for teachers in the appropriate uses and techniques of instructional television.

GOAL 2: TO COMMUNICATE ABOUT OUR SCHOOLS WITH INDIVIDUAL CITIZENS AND COMMUNITY ORGANIZATIONS.

Objectives:

1. To deliver student-produced programs through the home cable network.

2. To deliver administrative information to parents and interested citizens.

3. To cablecast School Committee deliberations or discussions about School Committee meetings.

GOAL 3. TO GIVE TEACHERS IN-SERVICE TRAINING IN CRITICAL VIEWING SKILLS.

Objectives:

1. To provide instruction in viewing skills.

2. To increase student opportunities to learn and make judgements about television production techniques and programming.

3. To give teachers in-service training in critical viewing skills.

GOAL 4. TO BE FISCALLY RESPONSIBLE WHILE KEEPING CURRENT WITH TECHNOLOGICAL ADVANCES.

Objectives:

1. To wire the schools and provide equipment.

2. To work with the cable company to maintain equipment.

3. To continue to work with the Cable Advisory Board to seek ways to fund needs.

4. To make staffing decisions related to the development of cable television programs.

GOAL 5. TO BE MORALLY RESPONSIBLE AS WE CREATE PROGRAMS AND SHARE INFORMATION.

Objectives:

1. To write policy statement(s) for the recording of school events, programs and information and its release.

2. To establish a review committee of faculty and administrators to adjudicate any questions which may prove delicate.

Once franchising has been completed you move into PHASE II: SYSTEM INSTALLATION. The smoothness with which this occurs depends greatly on how thorough the dIssuing Authority and cable company have worked out the license and how completely the schools have planned for the arrival of cable technology.

You probably concluded early on that your system's goals and the cable company's goals are dramatically different. We are committed to educating both our students and our community whereas cable is committed to making money. So it behooves you from the start to "recognize that cable operators will respond to pressure of the educational community, IF, AND ONLY IF, they feel it is ultimately in their best financial interest to do so. Since the school population and their parents in most towns, represent a sizable constituency, schools can and do have bargaining power with the cable operator, but only if they make their needs known. It is in the best interest of the cable operator to please the home subscribers, providing them with a wide choice of programming; good educational programs, some school-produced, adds to that choice. Thus, where the institutional loop is tied in with the home subscribers programming serves as good "PR" for the cable operator. An exciting school cable program is a valuable feather in the cap of any cable operator concerned with his or her image" (M.A.S.S. 7 D.O.E.,1983).

As stated earlier in the pre-cable section, the school system's representative will play a vital role in this stage and hopefully will be armed with specifications outlined in the awarded license to protect and provide for the system's needs.

An organized network of teachers, one from each building, administrators, and media staff will provide the cable coordinator with crucial support. Your system does not want to "buy into" this technology and then have no one interested in using it.

Experience proves that drop sites can be a major problem area right from the start. Once the license is awarded the cable operator has a specified calendar to install the entire system which includes the institutional loop (I-LOOP) on which schools should be included. Designating school drop sites is crucial and should be arranged with faculty input. It will serve no purpose if a drop is located in a room no one can schedule or use!

Once all the sites are selected, my recommendation is to circulate a list of site locations to all principals, cable coordinator, head of maintenance and the cable company representative. Make provisions to have your school cable coordinator present when the schools are being wired. Often, the company wiring the town is a subcontractor and will not have to live with the fact that "Yes, the auditorium has a drop just as we asked, but it's in the center of the stage!" It costs (the school system) to have drops moved so save yourself the time, frustration, and money by staffing school personnel to oversee the wiring.

Hopefully, you have lobbied to have the cable studio located in one (preferably the high school) of your schools. Through two years of visitations, lectures and conferences I found that the best use of our town cable facility would evolve if the studio was built into the high school. Logistics, schedules, transportation, and curriculum design were the areas addressed in this needs assessment and, luckily, all competing cable companies and the town Advisory Board agreed on the proposed location.

If you choose not to lobby for the community facility to be located in one of your schools, you should lobby for the company to provide the schools with a good portion of equipment and wiring which you have researched as necessary to support your video program.

Once your construction process is well underway and supervised by your cable coordinator, you should address funding. Quite probably, this aspect has been tangentially addressed all along. Now that you have your drops and any studio facility provided for, your "cable committee" should work with your cable coordinator to address the needs of each building.

Funding takes many forms: contributions from townspeople and/or organizations, school improvement councils, industry, school budgets, parent organizations, and grants are the sources we have tapped in Marblehead.

I can not stress enough the need for you to develop partnerships with community groups and to promote and publicize your school cable services and activities. "Let the local newspapers, radio and TV stations, civic groups, and businesses know of your cable work. But start with your own teachers, via your media specialist and or a school cable newsletter. Squeeze the maximum usage out of your system. Some programs take a lot of promotion, while others seem to promote themselves. Other promotional ideas: use the free TV guides available in most communities; add school flyers on adult-oriented programs to the weekly shoppers' guide; make sure that the cable operator includes a listing of programs available to the home subscriber which are educational as part of their regular cable TV guide, and your Community Bulletin Board." (M.A.S.S. 7 D.O.E., 1983).

Concurrent with your studio construction, wiring, and funding plans it is important to plan for staffing. It is unrealistic to expect your Cable Coordinator to operate as a video technician, T.V. Production teacher,cable liaison, grant writer, etc., so a full-time video technician, if not provided even on a temporary basis by the cable company, should be funded immediately. The person will spend considerable time "on the production front line" and should be on-staff as soon as possible. In Marblehead, we have combined this position as a video technician T.V. teacher by hiring a woman from the cable field who has teaching credentials. Finding a person such as this is extremely helpful as well as exciting because she has expertise in both areas so the responsibilities of teaching and producing educational programming for the local channel comes far more easily and is up to cable standards.

Policy decisions and compromise are next on the strategy agenda. Assuming that the school and the community cable operation will co-exist in a school building, there needs to be careful negotiation to provide for the following:
1) liability insurance;

2) equipment and facility usage and insurance requirements;

3) ironing out interscholastic athletic association rules for cablecasting;

4) addressing school use hours vs. local programming schedules;

5) writing quidelines about when to request cable company equipment vs. in-house equipment and to provide program proposal forms to all staff complete with procedures for program production cleared through the cable coordinator;

6) developing a policy to cover any use of cable equipment by student and specify supervision needs;

7) agreeing on cablecast programming standards from the start so that the schools are portrayed in a timely and professional manner;

8) stipulating what types of school programming should be covered by the cable company;

9) arranging for training of staff by cable employees as soon as possible to maintain momentum during the early days;

10) devising some form of evaluation to measure program development and the cable company's fulfillment of its licensed agreement(s) with the schools.

PHASE III of the process is CABLE REALITY.

When construction is complete and the system is live. Of course, none of these very broad stages clearly ends when another begins, so think in terms of TRANSITIONS. Key to the success of your system's cable reality is:

TRAINING:

Those key faculty and administrators identified earlier as your "cable committee" are the logical group for your first hands-on in-service training program and a resource for the development of a K-12 training needs assessment survey.

In Marblehead, during our first six months of cable reality, I outlined a three-day hands-on workshop for a cross section of the K-12 faculty which focused on 1) overview of the system and, 2) basic television production. The participants were funded from the school budget summer curriculum funds. Simultaneously, we conducted a full-day administrators' workshop with a focus on cable overview and curriculum design. Both workshops were actually given by the cable company staff.

The next phase of training was twofold and extended throughout the first full year of cable reality. These sessions involved: 1) released time for follow-up studio training with the original teacher group, and 2) two concurrently run visual literacy workshops funded from Massachusetts Department of Educaiton technology grants. Consultants were hired from Boston College to work with staff to train beyond production and develop skills in and a curriculum for visual language and literacy.

Beginning this year ('87), we are focusing our training on in-house equipment (1/2" camcorders) by grade level. These sessions will be held during released time and faculty meetings.

CURRICULUM INTEGRATION:

Our studio functions as a classroom during the school day. Our curriculum design has evolved into a team-taught core of three T.V. production classes offered through the Practical Arts and Instructional Resource departments. These courses were designed in a sequential manner as follows: Television Production I = half-year course covering basics; Television Production II = full-year course, including editing, with individual student projects; Television Seminar = for advanced students who are able to work on their own and are knowledgeable in cablecasting skills. Their projects are aimed for cablecast quality during the school system's time slot on the local channel.

Extensive work has been done with the English department to integrate units of production into classes such as Media Impacts, ninth and tenth grade English, and in the Social Studies and Foreign Language departments.

Because our training sessions have included K-5 staff, we have had much success integrating very basic television production (and viewing) skills at that level.

Future plans focus on middle school curriculum integration which until recently had scheduling problems impeding such development.

As with other forms of media and technology, when staff is comfortable with their level of expertise and/or trusting of other staff who will team with them in the teaching processes a level of excitement and energy is generated which the students share.

We have, from the first workshop, had a nuclear group of faculty and administrators who have seen the potential of television for learning and have readily taken the opportunity to use the medium in their teaching.

More and more of our students are opting to elect the production classes and are now becoming involved in the creation of our monthly school program called "Red and Black Magazine" which is cablecast to the community.

FUNDING:

As mentioned in previous sections funding continues to be a major focus during this phase. Equipment costs, as does training, so it is necessary to keep up with State Department grants, local contributions, school system budget, donations, and fundraisers.

STUDENT RESPONSIBILITY:

This can be a major source of satisfaction as well as assistance to both you and the cable company. The students are capable and do enjoy creating programming.

Six and one half years since our first meeting in July, 1981, Marblehead has

1. located a 3/4" complete studio in the high school
2. included all schools on the I-LOOP

3. hired a video technician who is a trained teacher
4. developed a comprehensive course offering for both production and and literacy skills
5. regularly cablecast school programs to the community
6. trained a good cross section of the K-12 faculty and continues to do so
7. acquired interactive video, modems, and computer networking funds for future developments
8. received grant money for training
9. created solid community and school committee support for the cable program
10. funded travel to sustain the initial enthusiasm.

BIBLIOGRAPHY

Cable Television in the Schools: A Resource Document. Massachusetts Association of School Superintendents and Massachusetts Department of Education, June, 1983.

Miller, Philip, "Life after Franchising: Obtaining and Maintaining School Cable Services". Address to the New England School Development Council Conference (NESDEC) March 26, 1982.

Using Filmstrips in the Classroom to Develop Comprehensive Skills

Inez L. Ramsey

THE DIRECTED READING-THINKING ACTIVITY

Singer and Ruddell (1985) in their review of theoretical models and processes in reading instruction reported that many strategies have been formulated to facilitate students' growth in reading comprehension. From the perspective of schema theory, they recommended prediction techniques, such as those employed in Russell Stauffer's (1985) Directed Reading-Thinking Activities (DRTA) model, as effective strategies for increasing reading comprehension. They stressed that the goal of such strategies should be reader independence, that is students should ultimately be able to employ such strategies on their own. Based upon Stauffer's model, teachers should aim to help students formulate their own questions about reading materials, develop hypotheses, gather information to answer their own questions, and reformulate hypotheses on the basis of evidence.

Stauffer's DRTA is a predictive model. He argues that the reading-thinking process begins in the mind and that predictive questions provide the directional and motivational impetus to keep a reader on course. He outlines his model as follows:

I. Pupil actions

    A. Predict
    B. Read
    C. Prove

II. Teacher actions

    A. What do you think? (active thought)
    B. Why do you think so? (agitate thought)
    C. Prove it. (requires evidence)

Researchers (Petre, 1971; Anderson, Mason, Shirey, 1984) have provided evidence that Stauffer's DRTA has been effective in increasing elementary age children's recall, comprehension, and critical thinking skills.

THE DIRECTED VIEWING-TEACHING ACTIVITY

Minor and Cafone (1977) suggested that the DRTA should be applied to the viewing process to facilitate learning through viewing. They, in effect, advocated substituting viewing for reading in their Directed Viewing-Teaching Activity (DVTA). In their example, predictive activities similar to those used by Stauffer were applied to students' interaction with 16mm film. They stated,

> "The ultimate goal of the DVTA is to foster the development of an active meaning-gathering viewing attitude and corresponding viewing skills, and to increase the awareness of the learner of a viewing process. The teacher guides the viewers through the process until it becomes internalized and automatically employed in all viewing" (p. 20).

WORDLESS PICTURE BOOKS & FILMSTRIPS AND THE DVTA

Wordless picture books which tell a story are readily adaptable for use with elementary children in a DVTA. Wordless picture books in filmstrip adaptation are especially useful since they can be shared easily with larger groups of students. Wordless picture books have been used in elementary curricula in creative writing activities, as vehicles for developing children's abilities to make inferences about a story, and in promoting visual literacy. Jett-Simpson (1976) in a study using wordless picture books concluded that children's verbalized responses to inferential questions can reveal comprehension. Wells (1975) in a study combining visual literacy techniques and language experience using wordless picture books and nonnarrated films found significant growth in reading and in growth of language facility, both oral and written.

Use of the DVTA with filmstrips adapted from wordless picture books provides children with opportunities to hypothesize, make inferences, identify cause/effect, gather data, test hypotheses and rehypothesize. Wordless picture book filmstrip adaptations are especially good vehicles since generally there are no extraneous story frames. Each frame adds further information for processing as students predict what will happen in the story.

DVTA PROCESS

Students first view the title frame of the story. The teacher asks questions, such as "What do you think will happen in the story?" Questions of this type will elicit a wide range of responses. The teacher serves as facilitator and accepts all predictions as valid. The class members view the first story frame. The teacher then asks questions, such as "What is happening in the story?" and "Why do you say that?" After discussion, the teacher asks, "Does anyone want to change his mind about what will happen in the story?" Those children who respond positively may be asked, "Why?" The students are then asked to hypothesize again about the story. This procedure can be repeated for each frame or for a selected sequence of frames. In this manner the children become active participants in problem solving and predictive activities. Skills developed in this simple application of the DVTA can then be transferred to other, more complex materials.

In selecting wordless picture books and filmstrip adaptations, teachers will need to evaluate the quality of both the story and the pictures. Some questions which might be asked are:

(1) Is there a clear, linear storyline?

(2) Is the plot interesting to the age group?

(3) Are the pictures clear and of good quality?

(4) Do the pictures tell the story clearly?

(5) Is the readability level of the pictures appropriate to the age group?

For help in locating appropriate picture books and filmstrips, talk with your school library media specialist. Patricia Hutchins' wordless picture book, Changes, Changes, is a good example. The filmstrip adaptation is available from Weston Woods.

The application of predictive techniques to student interaction with educational media is a promising tool for increasing student comprehension. The effectiveness of the DVTA in developing recall, comprehension, and language development in children provides promising avenues for research.

REFERENCES

Anderson, R. C., Mason, J. and Shirey, L. L. "The Reading Group: An Experimental Investigation of a Labyrinth." Reading Research Quarterly, 1984, 20, 6-38.

Jett-Simpson, M. "Children's Inferential Responses to a Wordless Picture Book," Research prepared at the University of Wisconsin, Milwaukee, ERIC.

Minor, B. J. and Cafone, H. "Reading Techniques Make Media Meaningful." Audiovisual Instruction, 1977, 20, 19-20.

Singer, H. and Ruddell, R. B. Theoretical Models and Processes of Reading. 3rd ed. Newark: International Reading Association, 1985.

Stauffer, R. G. Directing the Reading-Thinking Process. New York: Harper & Row, 1975.

Wells, T. M. "An Investigation Designed to Test the Feasability of Using Verbal Literacy Techniques and the Language Experience Approach to Reading to Develop the Reading Abilities of Remedial Fourth Grade Students," unpublished doctoral dissertation, Michigan State University, 1975.

Toward an Alternative Perception of the Practice of Schooling: Beyond Mere Effectiveness

J. Randall Koetting

> ...our language promotes a view, a way of looking at things, as well as a content to be observed. This language, I am arguing, derives from a set of images, of what schools should be, of how children should be taught, and of how the consequences of schooling should be identified. Language serves to reinforce and legitimize those images. Because differences between, say, terms such as instruction and teaching are subtle, we often use a new word without recognizing that the new word is capable of creating a new world. (Eisner, 1985, p.355)

The power of words (languaging) is probably the most overlooked, least understood, and ultimately most neglected phenomenon in the field of education. Words serve to produce a paradoxical situation: words can both "freeze" and "unfreeze" reality. It is my contention that the language we use in education tends to provide more of a "freezing" function.

In the first part of my paper, I will identify this freezing of educational reality. It can be seen in the almost exclusive use of a technical-rational, management model of school practice, based on behavioral, positivistic, quasi-scientific language. This has become the dominant way of perceiving and talking about schooling. I will argue that the current emphasis and obsession with students' scores on standardized tests has shifted attention from the art and craft of teaching to the "science and technology" of teaching. This has primarily taken the form of perceiving and talking about schooling from an effective schools/teaching model (Hunter, 1984; Lazotte and Bancroft, 1985). The basis of this model is also found in management/systems thinking applied to the instructional process (e.g. the dominant models of curriculum development). From other than a behavioral/management model of schooling, this way of "seeing" education is a reductionist view of the teaching/learning process and severely limits our ways of looking at, talking about and living with students.(1)

In the second part of my paper, I will offer an alternative model for analyzing school practice, Elliott Eisner's (1985a) notion of educational connoisseurship and educational criticism. I will argue that Eisner's aesthetic paradigm can provide education a broader conceptual base from which to work in better understanding the complexities of the schooling process. This conceptual base will give educators a more diverse language system to understand and interpret what they see, and, vice versa, what they see and observe will not be limited to forms of expression that use technical language.

The importance of examining this issue cannot be over stressed. Educators use and/or invent words to serve as tools and their perceptions become controlled by these creations. Language which is intended to explain or describe reality becomes reality. What can't be explained (or programmed into a computer) is too often ignored and ultimately dismissed. I am arguing that the way we talk about a phenomenon determines what we see before we look. The language of a field encourages human encounters to be a priori. If we are to pursue the reality of the teaching-learning act, educators must uncover the meanings of words blurred by custom and usage and be willing to examine the conceptual base of their views of school practice.(2)

The Dominant Model of Schooling

Wanting teachers to be effective and competent seems to be a reasonable expectation. However, designing the means of determining teaching effectiveness and teacher competency becomes complex. Traditionally, the major thrust in teaching effectiveness and teacher competency studies has been an emphasis on designing research studies that focus on the technical and political aspects of the teaching-learning experience. Basically, this research includes studies concerned with various instructional methodologies and pupil achievement (Fisher, Mariave, and Filby, 1979; Good, Biddle, and Brophy, 1975; Russell and Fea, 1963), teacher characteristics and teaching effectiveness (Coker, Medley, and Soar, 1980; Getzels and Jackson, 1963; Raskow, Airasion, and Madaue, 1978), and teacher behaviors as related to pupil achievement (Good, 1979; Rosenshine, 1976; Withall and Lewis, 1963).

In these paradigms for studying teaching effectiveness and teacher competency, little attention is focused on the nature of the research questions or why they were posed. To be satisfied with asking the right research question is not enough. Responsible educators must ask why the question was asked and why it was phrased in a particular manner. The scope and nature of research questions cannot be neglected. Scientific investigation is not value-neutral.

A possible, and often overlooked, explanation causing the study of teaching effectiveness to follow technical lines of investigation may be the language of teaching. The power of language to influence or direct the study of teaching is supported by Soltis (1973), who suggests that a complex educational system develops a specialized vocabulary. Educational words have power--the power to direct the procedures and purposes of researchers. Typical words used in research on teaching effectiveness are behavior (student and teacher), effectiveness, personality, achievement, outcomes, interaction, characteristics, behavioral measurements, and performance. More recently, the literature is using such words as direct instruction, time on task, assignments, expectations, monitoring, pupil task involvement, seat work, and a whole host of terms reflecting technical and political value bases. The metaphorical bases of these words are industrial, military, and medical. For example:

Industrial - classroom management, cost effectiveness, efficiency, institutional planning, programming, output measures, product, feedback, defective, input-process-output, quality control, time management.

Military - target population, information system, centralization of power, line and staff, scheduling, discipline, objectives, teaching strategies, maintain.

Medical - diagnosis, treatment, prescription, remediation, monitor, label, deviant, impaired, referral-procedure, special needs.

These metaphors encourage teaching-learning research to be viewed and investigated from a technical perspective. Researchers invented words to serve as tools and now they are controlled by these tools. Language which is intended to explain or describe reality too often becomes the reality. What cannot be explained with language is often ignored and ultimately dismissed. As mentioned earlier, words serve to produce a paradoxical situation, namely, the freezing and unfreezing of reality. Unfortunately, within the field of education, the words used tend to provide a freezing function. I believe this is due to the technical emphasis on defining terms, along with the emphasis on observable behavior to explain the human condition. If researchers are to pursue the roots of reality relative to teaching-learning, they must uncover the meaning of words blurred by custom and usage. Researchers of teaching effectiveness are affected by language and, more often than not, their research efforts reflect the posed meaning these words possess.

As expressed by Frymier (1972, p.13), there are languages of conditional relationships and relationships "without conditions": the first is a language of "control"; the second is a language of "love and growth." One has to wonder if teaching effectiveness has as its priority control or learning (love and growth). Roberts (1976, p.321) echoed this sentiment when she wrote, "It is impossible to practice the ideas of Skinner and Chomsky simultaneously."

Heubner (1966) discusses the dangers involved in the languaging activity. He refers to the language of the technical model in education as the prevailing focus during the past few years. Heubner, according to Macdonald (1977, p.15), "...opens the possibilities of political, aesthetic, and moral talk."

It is my contention that the language of the technical model applied to teaching effectiveness research has contributed to a simplistic, input/output understanding of educational experiences ("student-as-product" orientation). The technical model, along with the technical-rational language, suggests that the "right mix" of technique and content will significantly increase student performance. Teaching is viewed as a "science and technology" with identifiable skills lending themselves to short-term teaching goals that focus on a utilitarian perspective. Tabachnick, Popkowitz and Zeichner (1979-80) suggest that this leads to a managerial understanding of teaching.

The language of the technical model applied to teaching effectiveness suggests scientific accuracy and predictability, and the nature of this model has an interest in control (management and engineering). The historical roots of this orientation have been outlined by others (Apple, 1979; Giroux, 1980; Kliebard, 1975). Tabachnick et al. (1979-80, p.16), in their research on the student-teaching experience, observed student teachers engaged in the "routine and mechanistic teaching of precise and short-term skills and in management activities designed to keep the class quiet, orderly, and on task."

As the teaching profession has become an increasingly highly-skilled technology with a primary emphasis on methods and outcomes, teachers have been rewarded for guiding their practice in ways amenable to this technology. As Macdonald suggests (1975), this notion implies that "teachers are potentially interchangeable," and leads to viewing productive activity as something learned and performed "mechanistically." Thus, any "good" teaching activity can be reproduced by any other teacher, and "...all productive teaching is measureable in terms of the criteria of the accountability in use" (pp.79-80).

Apple (1982) refers to this as a process of "deskilling-reskilling" teachers:

> As the procedures of technical control enter into the school in the guise of pre-designed curricular/teaching/evaluation 'systems,' teachers are being deskilled. Yet they are also being reskilled in a way that is quite consequential. ...while the deskilling involves the loss of craft, the ongoing atrophication of educational skills, the reskilling involves substitution of the skills with ideological visions of management. (p.256)

Tom (1977) contends that what is lacking in the managerial perspective is the acknowledgment of interpersonal or social relationships:

> ...these relationships cannot be reduced to a collection of techniques without debasing them and stripping them of their humanity. However, even if one rejects this humanistic concern, there is another fundamental problem. A technology must have definite ends toward which its activity is aimed. There is, of course, no long-term consensus on the aims of education. (p.78)

The lack of consensus on the aims of education within the technical model is not viewed as problematic because there are common sense understandings of purpose within the model. The position here becomes one of value-neutrality, that is, teaching and learning as apolitical.

Giroux (1980) suggests that the political nature of education programs is seen in the language used to address everyday school practices. Stating that teacher education programs serve as socializing agencies enbodying "...rules and patterns for constructing and legitimizing categories regarding competence, achievement, and success," (p.8) he suggests that this, in turn, serves to define specific teacher roles

> ...through the language they use and the assumptions and research they consider essential to the teaching profession. The basis premises and rules that underlie such programs usually viewed as common sense perceptions; they go unquestioned and often result in many problems in the teaching arena to be defined as basically technical areas.

In the same vein, Foshay (1980) proclaims the importance of language and its linkage to practice. He states:

> It is scarcely recognized the way we talk and think has a controlling effect. Behind our manifest language is a metaphor. which carries latent meanings to events. Behind our action is also theory about the domain of action. (p.82)

Foshay's contention provides a clear picture of how theory and practice, talk and action are underlying sequences in everyday events and, quite possibly, research efforts. Haplin (1969) lends support when he states:

> But if the word is only as good as the idea behind it, we as educators should ask questions more frequently than we do, not just what this or that educational word means, but to what assumptions, values, theories, procedures, and strategies for teaching these words commit us. (p.335)

I believe either certain words used in teaching-learning research help us to "see" teaching effectiveness in a certain way, or ways of "seeing" teaching-learning have generated certain language systems. Casual priority does not seem particularly important here. What is important is the current language used connotes a simplistic technical view of teaching-learning.

Discussion

The non-neutrality of methods of inquiry has been argued by Habermas (1971) (3). Educators have argued the non-neutrality of education as a process (e.g. Apple, 1979; Aronowitz and Giroux, 1986; Dobson, Dobson, and Koetting, 1985; Eisner, 1985a and 1985b; Freire, 1970; etc.). However, the encouraged model of perception in teaching is one of value-neutrality in the form of observation. Certain behavioral characterictics of children are classified and labeled and teachers are trained to see these. This activity has resulted in the field of teacher education caught in an "if-then" mentality, a reduction of the cause-effect model borrowed from natural science. If a child exhibits a certain behavior, then an appropriate treatment is prescribed. Apple (1979) argues that educators have borrowed a reconstructed logic of science and applied it to curriculum and pedagogical research and practice.

Patterns of thought or the usage of language schemes borrowed from the natural sciences simply do not summarily fit the social sciences. Exactness and precision are needed when dealing with things (natural sciences) for purposes of prediction and control. However, lattitude and flexibility are needed when dealing with human beings for purposes of growth, emancipation, and understanding.

Apple (1975a) contends that "...two major problems in education historically have been our inability to deal with ambiguity, to see it as a positive characteristic, and our continual pursuit of naive and simplistic answers to complex human dilemmas" (p.127). He continues by suggesting that phenomenologists seek to cast aside their previous perceptions of familiar objects and attempt to reconstruct them. The work of the phenomenologist is to see the phenomenon as it is rather than as it is suggested. The basic question becomes one of whether or not "familiar" educational constructs for viewing and speaking of children are adequate relative to the potential of children.

The consequences of an over-reliance on a technical-rational, scientific, management model for viewing the process of schooling have been numerous. So, too, the impact of the language used in this model. Eisner (1985a) identifies six consequences that he sees as most important. The first consequence is that a "scientific epistemology" dominates as the only legitimate means of educational inquiry. All other views are excluded . Secondly, this "scientific epistemology" in education is preoccupied with control. This has resulted in attempts at developing "teacher proof" curriculum materials and, diagnostic/prescriptive models of teaching (pp. 17-18). A third consequence is a preoccupation with "standardized outcomes," manifested in the current "testing movement" and teacher accountability/effectiveness (p.19). Fourth, students have no role/participation in developing educational programs because "the provision for such opportunities would make the system difficult to control, hard for educators to manage, and complex to evaluate" (p. 19). A fifth consequence is fragmentation of the curriculum. This results in breaking up complex tasks into smaller, "almost microunits of behavior and in the process to render much of the curriculum meaningless to children" (p.20). A sixth consequence is that educational language has become an "emotionally eviscerated form of expression; any sense of the poetic or the passionate must be excised. Instead, the aspiration is to be value neutral and technical. It is better to talk about subjects than students, better to refer to treatment than to teaching, better to measure than to judge, better to deal with outputs than results" (p.20).

A way to address the limitations and consequences of the technical model identified by Eisner is to reconceptualize the schooling process. For example, Eisner (1985a) states that we need educational theory that "unapologetically recognizes the artistry of teaching" (p.22); that we need to develop "methods that will help us understand the kind of experience children have in school and not only the kind of behavior they display" (p.22). To gain an appreciation of educational experience will require methods of analysis and language forms that are different from the technical model. What the study of education needs

> ...is not a new orthodoxy but rather a variety of new assumptions and methods that will help us appreciate the richness of educational practice, that will be useful for revealing the subtleties of its consequences for all to see.

Professionals must deal not only with what they see but with why they see what they see (Dobson, Dobson, and Koetting, 1985). The way educators look at (perceive), talk about (language), and live with (experience) children is an area worthy of critical analysis. The next part of my paper will explore one alternative framework for viewing schooling that adresses the consequences of Eisner's ideas, that allows for the complexities of schooling and that accepts the interplay of perception, language, and values that are at work in looking at schooling.

An Alternative Perception of the Practice of Schooling

The inherent limitations of the technical model of schooling and its attended language system cannot be over come by "fine-tuning" the model. What is needed is an alternative conceptual base for looking at and talking about achooling. One such alternative model with an attended language system is Elliot W. Eisner's notion of educational connoisseurship and educational criticism. Eisner (1985a) states that "this form of educational inquiry, a species of educational evaluation, is qualitative in character and takes its lead from the work that critics have done in literature, theater, film, music, and the visual arts".

Eisner contends that there are two forms of qualitative inquiry in the arts. Artists use a qualitative form of inquiry when they become involved in making statements about reality through their art. The result is a "qualitative whole - a symphony, poem, painting, ballet - that has the capacity to evoke in the intelligent percipient a kind of experience that leads us to call the work art". This is one form of qualitative inquiry. The second form is found "in the work of those who inquire into the work of artists, namely the art critics. The art critic finds himself or herself with the difficult task of rendering the essentially ineffable qualities constituting works of art into a language that will help others perceive the work more deeply".

The critic's work is to be a "midwife to perception", i.e. he/she must use their knowledge (connoisseurship) to make public the qualities that make up the work of art so that others may see the work more comprehensively. The critic's task is not to pass judgment, but to lift " 'the veils that keep the eyes from seeing' ". Thus criticism is defined as the "art of disclosure".

Eisner identifies two important points about criticism. First criticism is an "empirical" endeavor, i.e. "the qualities the critic describes or renders must be capable of being located in the subject matter of the criticism. In this sense, the test of criticism is in its instrumental effects on the perception of works of art". Thus criticism aims at understanding "qualities and their relationships."

The second point Eisner makes about criticism is that "anything can be its subject matter." Here, Eisner points out that criticism does not refer to "the negative appraisal of something but rather the illumination of something's qualities so that an appraisal of its value can be made" . The two points are crucial in understanding his . use of criticism within the educational context, because although educators sometimes refer to teaching as an art, the language they commonly use in describing or understanding educational practice is not criticism, but the language of science (usually qualitative, empirical data).

There is a definite relationship of educational criticism to educational connoisseurship. Whether within the arts or in education, effective criticism is an act dependent on the powers of perception. It is this ability to see, "to perceive what is subtle, complex, and important" that is the necessary condition for criticism. This act of "knowledgeable perception" is referred to as connoisseurship, i.e., to know "how to look, to see, and to appreciate." Connoisseurship is the art of appreciation. It is essential to criticism.

Without connoisseurship, criticism "is likely to be superficial or empty."

To be a connoisseur is to be involved in the art of appreciation. To be a critic is to be involved in the art of disclosure. Connoisseurship is a private act, consisting in the recognition and appreciation of the qualities of a particular, requiring neither public judgment nor public description of those qualities. Criticism, on the other hand, is "the art of disclosing the qualities of events or objects that connoisseurship perceives. Criticism is the public side of connoisseurship. One can be a connoisseur without the skills of criticism, but one cannot be a critic without the skills of connoisseurship" . Thus connoisseurship is essential to critisism, providing the "fundamental core of realization that gives criticism its material".

Experience in classrooms or educational settings is important to developing educational connoisseurship. Yet it is not a question of cumulative experience in classrooms. More important is the perception of, or "seeing" the experience, as opposed to "looking" or recognition of the experience for purposes of classification. Thus the connoisseur must become a "student of human behavior", seeing subtleties and focusing one's perception, attending to the "essence" of what is occurring. To attend to the essence of an event requires

> ...a set of ideas, theories, or models that enable one to distinguish the significant from the trivial and to place what one sees in an intelligible context. This process is not serial: we do not see and then assess significance; the very ideas that define educational virtue for us operate within the perceptual processes to locate among thousands of possibilities what we choose to see. The essence of perception is that it is selective; there is no value-free mode of seeing (Eisner, 1985a, pp.221-222).

In other words, our "perceptual processes" work within an "array of values and theoretical concepts that influence perception" . We use these theoretical constructs to better understand and interpret our world, and individuals will use different theories to explain/interpret the same reality.

It is here we begin to understand the demands placed on the educational connoisseur/critic, and the dynamic interplay between the two. It bears repeating that connoisseurship is a private act, criticism is a public act. One can be a connoisseur and not be a critic. But one cannot be a critic without being a connoisseur. To be a connoisseur of education requires "an understanding of different social sciences, different theories of education, and a grasp of the history of education" . The educational critic creates

> a rendering of a situation, event, or object that will provide pointers to those aspects of the situation, event, or object that are in some way significant. Now what counts as significant will depend on the theories, models, and values alluded to earlier. But it will also depend on the purposes of the critic.... What is rendered by someone working as an educational critic will depend on his or her purposes as well as the kinds of maps, models, and theories being used. (Eisner, 1985a, pp.223-224)

The notion of rendering is important here, and again, the interplay between connoisseurship and criticism is evident. The critic attempts to render, or translate into another language, to bring out the meaning of, to interpret qualities of something (an object, an event or experience, etc.), to disclose something that might not be evident. The importance of language and the distinction between discursive and non-discursive forms of expression is critical.

The technical-rational model discussed in part one of my paper severely limits the discourse about, and interpretation of, educational events. The limitation comes from the language system it uses, and the conceptualizations of schooling that become part of the language structure. This is a highly discursive form of communication, a language of classification, but not a language to use when particular "qualities of life" must be revealed.

Within Eisner's alternative paradigm, the mode of discourse is non-discursive, it is metaphorical. The critic must draw upon his/her knowledge/conceptual/experiential base and describe, interpret and evaluate what he/she experiences. This is the non-discursive mode of communication, a language form that "presents to our consciousness what the feeling of those qualities is." This is the language of literature and poetry.

> What enables us to participate empathetically in the events, lives, and situations that the writer portrays is not mere factual description.... What gives literature its power is the way in which language has been formed by the writer. It is the "shape" of language as well as the perceptive recognition of the

> metaphorical, connotative, and symbolic character of particular words and phrases that makes written language literature (Eisner, 1985a, p.226).

The skills of the critic, as both communicator and connoisseur, are evident here. This is where the art and craft of the critic come together, translating knowledge from one form to another form. The form of communication used by the critic becomes the public expression through which the "life of feeling" and qualities of experience are made evident and shared. "The arts are not a second-class substitute for expression; they are one of the major means people throughout history have used to both conceptualize and express what has been inexpressible in discursive terms" (Eisner, 1985a, p.226).

There are three aspects, or dimensions, to educational criticism: descriptive, interpretive, and evaluative. The distinctions between the three are more analytical than factual, i.e. they each have a different focus and emphasis. I will briefly discuss each of these.

In the descriptive aspect of educational criticism, the critic attempts to "identify and characterize, portray, or render in language the relevant qualities of educational life." Eisner sees this aspect as making the greatest artistic demands on the critic, i.e., it is this aspect of criticism where the critic's "verbal magic must be acute"(Eisner, 1985a, pp.230-231).

In the interpretive aspect of educational criticism, the critic asks and answers the questions: "What does the situation mean to those involved? How does this classroom operate? What ideas, concepts, or theories can be used to explain its major features?" This is where the critic's "connoisseurship" is drawn upon to use the multiple theories, viewpoints, frameworks, models, conceptualizations, etc., to interpret the meaning of events in educational settings. The important point is, the critic draws upon his/her knowledge and interprets classroom reality using different theoretical models.

In the evaluative aspect of educational criticism, the critic makes an assessment of the educational importance or significance of the experience he/she has described and/or interpreted. Some educational criteria must be applied in order for the critic to make a judgment about the experience. This brings out the normative aspect of, and the value-ladenness of, educational experiences. For example, the function of educational criticism is to "improve the educational process." This can't be done "unless one has a conception of what counts in that process". The conception of "what counts" in that process, what constitutes a quality educational experience, is dependent upon the critic's knowledge-base (connoisseurship). History and philosophy of education are most important areas of study for the educational critic to make judgments regarding the value of educational experiences. History of education provides "the context necessary for purposes of comparisons", and philosophy of education provides "the theories from which grounded value judgments can be made." Hence, a broad understanding of the divergent theoretical aspects of education "makes it possible for the educational critic to appreciate what he or she rejects as well as what he or she accepts within educational practice" (Eisner, 1985a, p.238).

The educational connoisseur/ educational critic understands the value-ladenness of his/her judgments. As is the case with any criticism, disagreement with any aspect (descriptive, interpretive, evaluative) of the criticism is open to debate. Eisner sees this as a strength of qualitative inquiry:

> For much too long, educational events have been assessed as though they were only one set of values to be assigned to such events.... Virtually every set of educational events, virtually every mode of school organization or form of teaching has certain virtues and certain liabilities. The more that educational criticism can raise the level of discussion on these matters, the better. (Eisner, 1985a, p.237).

Thus multiple perspectives and diverse theoretical positions expand the dialogue of educators to alternative possibilities, which could help us better understand the complexities of the educational process. The notions of educational connoisseurship and criticism could help us appreciate the complexity and provide a broader base for making educational judgments.

Concluding Comment

Eisner's perspective on qualitative inquiry directly addresses the limitations of the technical-rational model discussed in the first part of this paper. Connoisseurship/criticism allows for a diversity of methods in epistemology, it allows for diversity of teaching methodology, it allows for alternative evaluation methods other than standardized testing, it allows for participation of students in the over-all educational process, it conceptualizes the whole picture of education as opposed to parts, and it provides a language system that can deal with ambiguity and complexity. In effect, Eisner has provided a language that can help educators "see" education differently, or help them to understand why they "see" education differently.

The conceptualizations of educational connoisseurship and criticism and its attended diverse language system provide educators with a language of possibility that unfreezes educational realities. At the same time, this method of qualitative inquiry provides us with a method for uncovering the meanings of our language that might be blurred by custom and usage, and a method for examining the conceptual-base of our views on school practice.

Because of the moral nature of schooling, what we do in education is worth "another look". Knowledge, perception, language, beliefs, practice: there is no separation.

Endnotes

1. The reductionist view I am referring to is related primarily to the limited language system used to talk about, and hence work within, a teaching/learning situation. The language system/world view is technical, efficient, "given", and unproblematic. See Dobson, Dobson, and Koetting (1985).

2. The following assumptions undergird my position in this paper:
    a. The way educators talk affects what they see (perceptions). This phenomenon also works in a reciprocal fashion. Causal priority does not seem particularly important.
    b. Perceptions and language are reflective of the philosophic posture (value system) of the person observing and talking.
    c. The interplay of these three variables (perception, language, and value system) influences the nature of the teaching-learning experiences (Communication).
    d. The language of a profession can a priori determine perceptions and consequently human experience.
    (Dobson, Dobson, and Koetting, 1985)

3. Habermas' "theory of knowledge" has three forms, or processes, of inquiry. Knowledge can be arrived at through (1) the empirical-analytic sciences, (2) the historical-hermeneutic sciences, and (3) the critically oriented sciences (critical theory). These forms or viewpoints of knowledge results in three categories of possible knowledge:

    > Information that expands our power of technical control; interpretations that make possible the orientation of action within common traditions; and analyses that free consciousness from its dependence on hypostatized powers.These viewpoints originate in the interest structure of a species that is linked in its roots to definite means of social organization: work, language and power (Habermas, 1971, p.313).

    These categories of possible knowledge thus establish the "scientific viewpoints" from which we can know reality in any way whatsoever: "orientation toward technical control, toward mutual understanding in the conduct of life, and toward emancipation from seemingly 'natural' constraints (Habermas, 1971, p.311). These modes of inquiry with constitutive interests delineate the way in which individuals generate knowledge.

BIBLIOGRAPHY

Apple, M. (1979). Ideology and Curriculum. London: Routledge & Kegan Paul, Ltd.

Apple, M.W. (1982). Curriculum form and the logic of technical control: Building the possessive individual. In M.W. Apple (Ed.), Cultural and economic reproduction in education: Essays on class, ideology, and the state (pp. 247-274). London: Routledge & Kegan Paul, Ltd.

Arnheim, R. (1969). Visual thinking. Berkeley: University of California Press.

Aronowitz, S. & Giroux, H.A. (1985). Education under seige MA: Bergin & Garvey Publishers, Inc.

Coker, H., Medley, D.M., & Soar, R.S. (1980). How valid are expert opinions about effective teaching? Phi Delta Kappan, 62 131-134.

Dobson, R.L., Dobson, J.E., & Koetting, J.R. (1985). Looking at, talking about, and living with children: reflections on the process of schooling. Lanham, MA: University Press of America.

Eisner, E.W. (1985A). The educational imagination: on the design and evaluation of school programs. 2nd ed. New York: Macmillan Publish Company.

Eisner, E.W. (1985B). The art of educational evaluation: a personal view. Phil., PA: The Falmer Press.

Fisher, C., Mariave, R., & Filby, N. (1979). Improving teaching by increasing academic learning time. Educational Leadership, 37, 52-54.

Foshay, A.W. (1980). Curriculum Talk. In A. Foshay (Ed.), Considered action for curriculum improvement (pp. 82-94). Washington, DC: Association for Supervision and Curriculum Development.

Freire, P. (1970). Pedagogy of the oppressed. New York: Seabury Press.

Frymier, J.R. (1972). A curriculum manifesto. Oceanside, OR: Curriculum Bulletin.

Getzels, J.H., & Jackson, P.W. (1963). The teacher's personality and characteristics. In N.L. Gage (Ed.), Handbook of research on teaching (pp. 506-582). Chicago: University of Chicago Press.

Giroux, H.A. (1980). teacher education and the ideology of social control. Journal of Education, 162(1), 5-27.

Good, T. (1979). Teacher effectiveness in the elementary school: What we know about it now. Journal of Teacher Education, 30, 52-64.

Good, T., Biddle, B., & Brophy, J. (1975). Teachers make a difference. New York: Holt, Rinehart & Winston.

Habermas, J. (1971). Knowledge and human interests. Boston: Beacon Press.

Haplin, A. (1969). Change the mythology. Theory Into Practice, 8, 334-338.

Hosford, P.L., ed. (1984). Using what we know about teaching. VA: Association for Supervision and Curriculum Development.

Huebner, D. (1966). Curriculum language and classroom meanings. In J. Macdonald & R. Leeper (Eds.), Language and meaning (pp. 8-26). Washington, DC: Association for Supervision and Curriculum Development.

Hunter. (1984). Knowing, teaching, and supervising," in Hosford, Philip L., ed. Using What We Know About Teaching. VA: Association for Supervision and Curriculum Development.

Kliebard, H. (1975). Bureaucracy and curriculum theory. In W. Pinar (Ed.), Curriculum theorizing: the reconceptualists (pp. 51-69). Berkeley: McCutchan.

Lezotte, L.W., & Bancroft, B.A. (1985). Growing use of the effective schools model for school improvement. Educational Leadership. Vol. 42, #6.

Macdonald, J. (1975). The quality of everyday life in schools. In J.B. Macdonald & E. Zaret (Eds.), Schools in search of meaning (pp. 78-94). Washington, DC: Association for Supervision and Curriculum Development.

Macdonald, J. (1977). Values bases and issues for curriculum. In A. Molnar & J. Zahorich (Eds.), Curriculum theory (pp. 10-21). Washington, DC: Association of Supervision and Curriculum Development.

Raskow, E., Airasian, P., & Madaus, G. (1978). Assessing school and program effectiveness: Estimating teacher level effects. Journal of Educational Measurement, 15, 15-21.

Roberts, J. (1976). Freedom, the child, the teacher: A gap between ideas and actions. Theory Into Practice, 15, 319-325.

Rosenshine, B. (1976). Recent research on teaching behaviors and student achievement. Journal of Teacher Education, 27, 61-64.

Russell, D.H., & Fea, H.R. (1963). Research on teaching reading. In N.L. Gage (Ed.), Handbook of research on teaching (pp. 865-928). Chicago: University of Chicago Press.

Soltis, J.F. (1973). The passion to teach. Theory into Practice, 12, 46-49.

Tabachnick, R., Popkowitz, S., & Zeichner, K.M. (1979-80). Teacher education and the professional perspectives of student teachers. Interchange, 10, 12-29.

Tom, A.R. (1977). Critique of performance based teacher education. Educational Forum, 42, 77-87.

Wesher, A. (1976). Words as definitions of experience. Great Britain: Writers and Readers Publishing Cooperative.

Withall, J., & Lewis, W.W. (1963). Social interaction in the classroom. In N.L. Gage (Ed.), Handbook of research on teaching (pp. 683-714). Chicago: University of Chicago Press.

A Reality: Visual Literacy's Connection to Literacy in the Language Arts

Janice J. Wilson

Literacy or being literate are terms that are frequently heard and used in today's world. Most dictionaries define literacy as the "state or quality of being literate, especially, having the ability to read and write." Yet the definition of literate is much broader referring to a learned scholar or as one having an education. As a result, a wide variety of disciplines, language arts included, use the term "literacy" to refer to specified levels of competencies within those fields. The term "visual literacy" is also a multi-defined term and one that is used by film makers, educators, social activists, opthalmologists, artists, and educational psychologists. Hence, defining "visual literacy" becomes a complex, if not overwhelming task. Before attempting that task, a conceptual structure for the "wholeness" of literacy can be erected by visualizing the structure and growth of a tree--in which the mature tree represents a literate individual.

Returning to the definition of literacy as being the ability to read and write, let's assume that literacy is rooted in the processes of seeing, listening, and thinking because first we see or hear, then we think about what we have perceived before we are capable of reading and writing about it. In other words, people construct meaning from their perceptions and experiences of their environment and learn to respond appropriately to verbal and non-verbal symbols that represent that environment, thereby creating both a visual language and a verbal language. Paivio (1971) and Salomon (1979) both suggest that information is coded both visually and verbally and that mental imagery or the use of these internalized schemata is a form of thinking. Therefore, visualize that the trunk of the tree embodies the phonetic, syntactic, and semantic components of verbal language as well as the pictographic, ideographic, and alphabetic components of the visual systems. The paralanguages, e.g. body language, voice intonations and emphasis, must also be included as integral parts of developing language competency. Hence, from this trunk, the skills of literacy--decoding one's environment (reading) and encoding one's environment (writing)--grow and develop with the branches of the tree representing the interactive literacy events essential to the development of a literate individual in terms of the broader definition of literacy--that of an educated person.

The language arts have long been considered the component of the curriculum or educational system in which to develop the skills of literacy--reading and writing. The integrated model of language arts instruction emphasizes reading, writing, speaking, and listening skills as the four basic components for effective communication. However, in view of recent research developments, modern technology, and contemporary society, that model is no longer sufficient to produce students that can be competent communicators and effective participants in a rapidly-changing world.

Contemporary society is a visually-oriented one in which language usage and thought processes are tied to immediate visual images (Sinatra, 1973). The written paragraph is no longer the only way educated people communicate. Today, along with the grammar of words there is a grammar of images (Cochran, 1976) as well as a surface structure and a deeper structure of meaning to those images. The visual component of language must be incorporated into a newer model of language arts instruction and educators must come to understand the depth and importance of this component.

The contemporary student is a visual child because the child is usually bombarded from birth with a variety of interesting images and fast actions (Miller, 1976). According to Pflaum (1986), from the beginning of the use of words children have many more images than words to refer to those images. Holdaway (1986) believes that people tend to image and organize their world in distinctively visual ways and that children show an early preference for using visual strategies. If this is true, then one must have a way to share that visual language with others and to interpret the visual language of others. To accomplish such a task is to be visually literate.

Empowering students with visual literacy skills requires a working definition of visual literacy for educators as well as identification of visual literacy methodologies (Sinatra, 1986) beyond using media as enrichment or background knowledge. Visual literacy is more than illustrating one's writing after the writing process is completed. It is more than giving children pictures to arrange in some order or using pictures as clues to printed material. It is more than teaching children how to use a camera or other electronic media. So then, what exactly is meant by "visual literacy"? In relation to the concept of the literacy tree, visual literacy could be defined as possessing the ability to "read"--discriminate, decode, and comprehend visual actions, objects, and symbols; and the ability to "write"--encode and create visual actions, messages, and symbols to facilitate the development of communicative competency.

Besides a functional definition to guide development, teachers also need to know what the visually literate child can do that the verbally literate child cannot do and in what ways the visually literate child's behavior is different. A visually literate child can "read" visual language with skill. The child can compose visual statements with skill, perhaps with eloquence and can translate from the visual language to the verbal and vice versa. The child has a basic understanding of the grammar of visual language and some realization that it parallels verbal language. He or she is familiar with and somewhat skilled in the use of the tools of visual communication (Fransecky and Debes, 1982).

According to Moffett (1968), through visual language the child shares in a universe of discourse, where one sees, speaks, and writes "out" through photographs, drawings, and paintings one's efforts to bring order to his or her own particular experiences. The basic structure of visual language is a set of relationships between visual thinking, visual reading, and visual writing--the structure of discourse itself. Yet visual behavior is analogous to verbal behavior. Sinatra (1981) believes that classroom use of visual compositions help students compose coherent, unified pieces of written discourse. As students move through visual literacy activities, as they learn to report, to generalize, to organize, and to theorize about experiences; they symbolize actual events, they fictionalize, they "language" on many levels as they extend their own abilities to communicate both visually and verbally. Visuals offer pupils a fascinating way to share experience, and, at the same time, provide a meaning-centered, language-sharing technique.

Developing visual literacy skills must begin with the young, visually-oriented child. As Edmund Henderson (1986) noted, people are the only creatures who draw pictures and young children are initially uncertain about the two-dimensionality of a simple illustration. He believes that picture perception is a very complex activity and one that requires a good deal of experience. Teachers must provide these experiences to enable the child to learn to represent reality as that must precede the more complex task of learning to represent speech--as in printed text and writing. Therefore, experience with picture books and drawing is a prerequisite for written language acquisition. Wordless picture books can help structure experiences for students to become "image wise" as Hennings (1986) suggests. Teale (1982) also reinforces the belief that interactive literacy events are essential in children's development of reading and writing activities and Holdaway (1986) confirms that young children show a preference for using visual strategies over phonetic ones in early reading experiences. So it seems a well-developed visual sense is a significant asset in verbal communication (Rose, 1982). An effective reader of visual clues has a headstart at becoming a proficient reader of verbal clues, for visual readings frequently stimulate oral and written expression (Rose, 1982).

The old adage of "every teacher is a reading teacher" perhaps should be updated to "every teacher is a multi-literacy teacher." All teachers, on all levels, must be concerned about a student's ability to generate and process language so that he or she may speak or write effectively and develop a better base for thinking. But today's world also requires teachers to aid students in understanding how visual signs can influence one's perception of reality because visual symbols are a part of our culture (Hennings, 1986). Students need the ability to recognize the impact upon the individual of the content and the form of communication media, and to become critical, analytical consumers of media to avoid being only assimilators of the ideas emitted by the mass media (Hennings, 1986). By understanding the strategies, students can then employ many of the strategies to enhance their communicative competencies in any medium of the age.

Researchers have directed critical attention to the effects of visual literacy training on extending and enriching oral and written language facility, on developing self-concept, and on heightening environmental awareness. Researchers have proposed that when children are trained to use their existing "passive visual vocabulary", they can handle verbal language processes with more ease and purpose (Fransecky and Debes, 1972). Recent reseach into the differing functions of the right and left hemispheres of the brain are also affecting instructional strategies and curricula changes to help students learn to think visually, intuitively, spatially, and creatively (Johnson, 1985). According to Emery and Sinatra (1983), visual strategies that involve holistic processing play a significant role in assisting the development of verbal composing abilities. Yet, especially after the early grades, there is a tendency to minimize the visual aspects of communication and children are, in a sense, "weaned away" from pictures and illustrations and from drawing and illustrating their own work.

Since the 1960's teachers were prepared to select and use media for presenting information to large and small groups. The emphasis was on teachers using audiovisual materials to help students reach instructional objectives (Cochran, 1976). The concern of the audiovisual communicator in education has traditionally been to provide the teacher with superior messages that would transmit ideas more effectively to students. This viewpoint puts the tools of visual communication in the hands of the teacher.

In contrast, the visual literacy viewpoint puts the tools of visual communication in the hands of the student (Cochran, 1976) and the teachers, with emphasis on the students and what happens to them when they try to communicate visually. The goal is for the teachers to assist their students in creating, interpreting, and appreciating visual statements and to become actively involved in the learning process. Students learn approximately 90% of what they do (Thomas, 1975) and learning requires action by the learner plus an effort and a willingness to learn something new. Active physical involvement in the instructional event facilitates mental activity, but to do this, students must feel a reasonable chance of success and the information must be important to them-- meaningful as well as comprehensible and enjoyable. Visual literacy activities and strategies can meet these criteria.

Visual literacy activities can be integrated with all of the language arts activities to enhance and improve students' skills. There are pictures that just beg to be talked about. Books written by children and illustrated by their photographs are strong motivators for reading. The photographer and the writer share the same processes of selecting and structuring images (Lasser, 1976). In other words, a classroom experience using visual literacy activities will take the teacher and student away from the familiar terrain of the textbook and chalkboard and into a new, and exciting world of communication filled with creativity.

Creativity rarely seeks expression unless there is enough experience behind it that children feel they have something to say. (Pictures can be surrogates for experiences or extending experiences.) Almost any child can be stimulated to write or read or speak if first stimulated to look and listen in the classroom as well as within the child's total environment. A reader, writer, or speaker, is first of all a "see-er" and "experience-er". All sighted people can look at the visible world but many do not (or choose not) to see it. They may be constrained by assumptions about what they should see or their abilities have not been awakened (Rose, 1982). Visual literacy activities can help students see more perceptively and increase their base of experiences.

Visual literacy activities can further children's appreciation of the symbolic nature of language. Visuals aid in comprehending implied meanings and reinforce the emotional impact of words. An advantage of involving young people in written expression having a visual component is that one can capitalize on student appreciation of art activity and possibly that enthusiasm for art may be transferred to expressing with words (Hennings, 1986). By ordering visually, we learn how to order verbally (Sinatra, 1973). Visual experiences with tangible objects or pictures represent stability in contrast to most auditory experiences. Visuals are perceptually availiable because pictures do not disappear as we study them. Another advantage is that they can be viewed as a whole or in terms of their parts. Visuals provide the opportunity to respond appropriately to symbols that represent the environment in miniaturized fashion: pictures, diagrams, printed words, and numerals.

It is probably easier for teachers to integrate visual literacy activities with writing activities. This is due partly to the research that has been provided by Donald Graves, Frank Smith, and others into the writing process (Emery and Sinatra, 1983). Handing children blank sheets of paper and saying, "now children you can write about anything you want", can be scary and leave many would-be writers without any idea of what they could write about. So the task for the teacher is to help students have both a purpose and topic for writing (Cochrane, Cochrane, Scalena, and Buchanan, 1984). Visual literacy activities can be used in the pre-writing or rehearsal stage to give students something of their own to write and reflect on. Teachers can guide students' discussions about photographs with an emphasis on the emotions or feelings evoked as a pre-writing experience for poetry writing. Photo essays can be used to promote organizational writing as the photos serve a means of communicating ideas visually before students begin transferring their thoughts to writing. Also, due to the fact that their series of photos says something, students are obliged to tell the story correctly as they saw it. This helps with inference skills, drawing conclusions, and making judgments. Both photographs and writing have "shape, pattern, texture, and form," so that children's writing should be the "positive print" of what was found in the photos (Cameras in the Curriculum).

Young children can use photographs to write rebus stories or make language experience books that they can later read. Photographs can also be used to help students learn to see different points of view, to become better observers, and to focus on details. And electronic media--slide tape programs, video tapes, movies--can be developed after the writing of a script in the post writing state. Enumerating the opportunities for visual literacy teaching strategies and learning activities could continue for several more pages.

The visual consciousness of the "television generation" is one of the differences between today's young people and the adult generation. Therefore, it behooves all educators to use that difference for the benefit of the students and their furture. With the rapid advancement in electronic media and technology, the core of the language program can no longer consist only of literature studies, reading activities, and composition activities as the primary manifestations of language. The relevance of visual language toward development of literacy in the language arts must be understood, appreciated, and incorporated by classrooms teachers at all levels of the elementary school.

References

Cameras in the curriculum, vols. 1 and 2. NEA Professional Library, P.O. Box 509, West Haven, CT 06516.

Cochran, L. M. (1976). The University of Iowa. *Visual literacy programs that work*, pp. 2-5. Kodak Pamphlet No. VR-6. Rochester, NY: Education Markets Services.

Cochrane, O., Cochrane, D, Scalena, S., and Buchanan, E. (1984). *Reading writing and caring*. New York: Richard C. Owen Publishers, Inc.

Emery, W. G. and Sinatra, R. (1985, May). Improving written literacy through visual literacy. Paper presented at Annual Meeting of the Canadian Council of Teachers of English, Montreal, Quebec.

Fransecky, R. B. and Debes, J. L. (1972). *Visual literacy, a way to learn, a way to teach*. Washington, D. C.: Association for Educational Communications and Technology.

Henderson, E. (1986). Understanding children's knowledge of written language. In D.B. Yaden, Jr. and S. Templeton (Eds.), *Metalinguistic awareness and beginning literacy* (pp. 65-78). Portsmouth, NH: Heinemann.

Hennings, D. G. (1986). *Communication in action: Teaching the language arts* (3rd. ed.). Boston: Houghton Mifflin Company.

Holdaway, D. (1986). The visual face of experience and language: a metalinguistic excursion. In D. B. Yaden, Jr. and S. Templeton (Eds.), *Metalinguistic awareness and beginning literacy* (pp. 79-99). Portsmouth, NH: Heinemann.

Johnson, C. (1985, March-April). Waking up the right brain. *Media and methods*, 8-9.

Lasser, M. (1976). The Harley school. *Visual literacy programs that work*, pp. 6-9. Kodak Pamphlet No. VR-6. Rochester, NY: Education Markets Services.

Moffett, J. (1968). *Teaching the universe of discourse*. New York: Houghton Mifflin.

Miller, S. (1976). Orient grade school. *Visual literacy programs that work*, pp. 30-33. Kodak Phamphlet No. VR-6. Rochester, NY: Education Markets Services.

Paivio, A. (1971). *Imagery and verbal processes*. New York: Holt, Reinhart, and Winston.

Pflaum, S. (1986). *The development of language and literacy in young children* (3rd. ed.). Columbus: Charles E. Merrill.

Rose, K. (1982). *Teaching language arts to children*. NY: HBJ, Inc.

Salomon, G. (1979). *Interaction of media, cognition, and learning*. San Francisco: Jossey-Bass Publishers.

Sinatra, R. (1973, November). A visual strategy plan for writing and organizational improvement. Paper presented at the N.Y. State Educational Communications Convocation.

Sinatra, R. (1981). Visual compositions and language development. *Technology and Mediated Instruction, 15* (2), 16-23.

Sinatra, R. (1986). *Visual literacy connections to thinking, reading, and writing*. Springfield, Illinois: Charles C. Thomas.

Teale, W. H. (1982). Toward a theory of how children learn to read and write naturally. Language Arts, 59 (6), 555-570.

Thomas, J. I. (1975). Learning centers: opening up the classroom. Boston: Halbrook Press, Inc.

See Jane, See Jane Compute?: Perceived Credibility of Adolescent Female Talent in Visual Presentations on Computer Use

Landra L. Rezabek

Educators, in general, are aware that visual and multi-media materials can be used effectively to enhance instruction. Yet, persons designing and utilizing instructional media may often focus on the subject content of these presentations while neglecting a factor which is capable of significantly influencing the effectiveness of visual presentations, namely, the talent chosen to appear in instructional productions. The credibility of persons who deliver instructional messages is a key factor influencing the effectiveness of media presentations utilized in educational settings (Fleming & Levie, 1978). Research in the field of communications indicates that a receiver's perception of the speaker's credibility is almost always related in some way to the impact and effectiveness of the message (Andersen & Clevenger, 1963). Thus, those designing and utilizing visual presentations must concern themselves not only with the content of the instructional message but with the credibility of the talent who appears in the visuals.

Talent credibility, however, is known to be affected by a number of variables. These variables include characteristics of the talent, characteristics of the audience, and the influence of the particular topic itself. Since an instructional message is a "pattern of signs (words and pictures) produced for the purpose of modifying the cognitive, affective, or psychomotor behavior of one or more persons" (Fleming & Levie, 1978, p. ix), talent chosen to appear in media productions should be most effective in their ability to influence learners to think, feel, or behave in accordance with specified learning outcomes.

Social learning theory (Bandura 1969, 1977, 1986; Bandura & Walters, 1963) suggests that visuals can play a role in influencing human behavior as part of a continuous interactive process involving cognition, behavior, and environmental factors. Observational learning is a key component involved in the social learning process and is defined as the "tendency for a person to reproduce the actions, attitudes, or emotional responses exhibited by real-life or symbolized models" (Bandura & Walters, 1963, p. 89). Learning is considered to occur through the observation of symbolized models, such as those appearing in visual presentations, and social learning theory emphasizes the importance of utilizing models who will be viewed as credible by the intended audience. Bandura (1969, 1977, 1986) further indicates that learner characteristics will influence the efficacy of any given model for any given group of observers. Additionally, Bandura suggests that the context in which the models appear will influence observational learning. Thus, a particular model's credibility may vary, depending on characteristics of the model, the audience, and the topic.

Selecting credible talent to appear in instructional media productions on the topic of computers and computer utilization is a challenge for persons interested in designing, producing, and utilizing media presentations for adolescent learners. Numerous articles in the popular press (Elmer-DeWitt, 1986; Horn, 1985; Sealfon, 1986) as well as entire special issues of professional journals (Lockheed, 1985a; Moursund, 1984) have noted an emerging gender gap in computer utilization between female and male learners which becomes most apparent around the time of adolescence. The gender gap is manifested in areas such as enrollments in computer literacy and programming classes, attendance at computer camps, home use of computers, elective time spent in computer activities, and level of elective computer instruction attained. The concern exists that secondary school students are perceiving computer use as a primarily male domain and that capable females are self-selecting out of computer courses and computer-related activities. The sex-typing of computer use as an activity inappropriate for adolescent females is believed to reduce females' potential for achievement in computer-related studies and associated careers (Jones, 1983; Moursund, 1984).

A proposed educational intervention to encourage adolescent females to participate in computer activities is to present computer-using female models in both live and mediated observational learning situations. Research on the impact of gender characteristics of instructional materials (Schau & Scott, 1984; Scott & Schau, 1985) indicates that instructional media can either restrict or broaden pupils' attitudes about who can or should participate in activities which are represented in media presentations. Investigation of ways in which instructional media productions can be designed to encourage young females as well as young males to learn about and utilize computers is justified. The selection of credible talent chosen to appear in such instructional media presentations is an integral part of this endeavor.

In selecting credible talent to serve as models for observational learning in the context of computer instruction, characteristics of the talent, characteristics of the learners, and the influence of the topic itself again emerge as primary considerations. Factors relating to the characteristics of the learners and to the characteristics of the talent which may affect the credibility of the talent include the age and gender of both the observer and the model. Peers are known to be effective role models in certain circumstances (Cantor, Alfonso,

& Zillmann, 1976; Conger, 1973; Kimmel & Weiner, 1985; Lueptow, 1984; Schunk, 1987; Weitzman, 1979). Learners may find talent of the same gender as their own to be most credible (Pearson, 1982a, 1982b; Schau & Tittle, 1985; Schunk, 1987). By observing peer models, adolescents learn about and often adopt attitudes and behaviors which they feel are appropriate for their gender as well as for their age (Kimmel & Weiner, 1985; Lueptow, 1984; Schunk, 1987). However, the tendency to sex-type computers and computing as an activity more appropriate for males than for females (Campbell, 1984; Elmer-DeWitt, 1986; Lockheed, 1985b; Sanders, 1985; Sanders & Stone, 1986; Schubert, 1984) conceivably affects the perceived credibility of female peer models appearing in instructional presentations on computer use. A female talent might not be perceived as credible, solely on the basis of her gender, when presenting information pertaining to the traditionally male domain of computers and computer use. Since adolescent females are considered to be the learners at risk in terms of computer instruction, and since the credibility of female talent for both female as well as male learners is unknown in this context, the present study specifically investigated the credibility of adolescent female talent within the context of computer instruction. Both female and male adolescents observed these female models, and the gender of the learner was one learner characteristic which served as an independent variable in the present study.

Another gender-related social message about computers which learners may receive is that computing is a solitary activity and therefore more appropriate for males. Lueptow (1984) suggests that traditional sex role stereotypes associate the female sex role with the characteristics of expressiveness, affective concern, relationship-orientation, nurturance, communion, and cooperation. The male sex role is traditionally associated with characteristics such as independence, self-sufficiency, task-relevant orientation, autonomy, self-reliance, and individualism. As Lueptow and others are quick to note, these qualities associated with female and male sex roles are generalizations and are neither good nor bad, but emerge as characteristics with which female and male sex roles traditionally have been associated.

These patterns of adolescent sex role development indicate that females are encouraged to form social relationships and to focus on interpersonal activities, which conflicts with the ways in which computer utilization often is portrayed and taught. As Sealfon (1986) summarizes, studies conducted by equity organizations indicate that adolescent "girls generally prefer people to things and enjoy working in groups more than pursuing solitary activities. Friendships and social interactions are important at this age but are rarely encouraged in computer work" (p. 54). The presence of other female friends and the ability to work in pairs at a single machine are strong inducements for female adolescents' participation in computing activities, with the implication for educators being "to encourage groups of girls

-- friendship groups -- rather than individual girls to use the computer" (Sanders, 1985, p. 26). It is conceivable that portraying female computer-using talent in pairs rather than as individuals may indicate to female learners that computer use is an activity in line with the traditionally female concerns for friendships and cooperation. Schunk (1987) also notes that multiple models may increase the effectiveness of observational learning situations. Such paired portrayals may affect the credibility of the talent appearing in instructional presentations. The portrayal of individual or paired adolescent female models was a talent characteristic which was utilized as an independent variable in the present study.

Another potential influence on perceived credibility of the talent is a learner's attitude toward the topic of instruction. Bloom's (1976) theory of school learning suggests that attitudes toward a topic which students bring with them to the instructional setting will influence both cognitive and affective learning outcomes. Reece and Owen (1985) corroborate Bloom's research within the context of computer instruction. Learners' existing attitudes toward computers may influence their perceptions of the credibility of the talent appearing in instructional media presentations on computer utilization. Learners' existing attitudes toward computers was a learner characteristic which served as an independent variable during the study.

This study examined adolescent learners' perceptions of talent credibility in the context of media presentations on computer utilization. Specifically, the study investigated the effects of 1) learners' gender, 2) learners' attitudes toward computers, and 3) presentation of individual or paired female peer talent on eighth grade learners' ratings of perceived talent credibility. The study sought answers to the following questions:

1. Does learners' gender affect ratings of perceived talent credibility?
2. Does learners' attitude toward computers affect ratings of perceived talent credibility?
3. Does the number of persons appearing on the screen affect perceived talent credibility?
4. Do learners' gender, learners' attitudes toward computers, and number of talent interact in any possible combination to affect ratings of perceived talent credibility?

Method

Subjects

Subjects for this study were 96 eighth grade student volunteers (56 females, 40 males) enrolled in careers and communications classes at a middle school (7th - 8th grade) located in the metropolitan Oklahoma City area. Seventy percent of all students enrolled in the school take the careers and communications classes. Subjects ranged in age from 13 to 15 years, with the majority of the participants being 14 years old. Ethnic distribution of students in the school was 95% Caucasian with the remaining 5% of students representing Mexican-American, Black, Vietnamese, and American Indian students. Students in this particular school district had been briefly introduced to computers at the elementary school level, but the middle school had no formal computer education program. Some students had access to microcomputers in the school media center, homes, or parents' place of employment.

Materials

Permission was granted the researcher to use Part I of the Minnesota Computer Literacy and Awareness Assessment, Form 8, (Anderson, Klassen, Krohn, & Smith-Cunnien, 1982) to determine learners' extant attitudes toward computers at the beginning of the study for purposes of randomly assigning students to treatment groups. This instrument is a 20 item self-report questionnaire designed to quantify attitudes toward computers with a Likert-type scale. An alpha reliability of .85 was obtained using the instrument in the present study, which adds credence to its status as an appropriate instrument to use in similar situations.

Perceived talent credibility was quantified by utilizing a scale adapted from the 42-item McCroskey Scales for the Measurement of Ethos (1966). McCroskey (1966) indicates that talent credibility is composed of the two factors of authoritativeness (competence) and character (trustworthiness). The first twenty-two questions on the eighth grade adaptation of the scale were designed to measure authoritativeness and the final eighteen items were designed to measure character, as patterned after the original McCroskey scales. Content and face validity of the adapted items were verified by experts in the field of communications. The internal consistency for the first and second administrations of this scale during the current study were .95 and .96 respectively. Cronbach alpha reliabilities for the authoritativeness subscale were .94 and .95 for the first and second administrations of the instrument, while alpha reliabilities for the character subscale were .92 and .95 respectively. These results indicate that this instrument may prove useful in future research to measure the perceived credibility of talent delivering instructional messages about computers.

Students were also asked to respond to three open-ended questions designed to indicate students' perceptions of the overall credibility (authoritativeness and character) of the talent. At the conclusion of the treatment sessions, students were additionally requested to respond to open-ended questionnaires asking them to describe classroom situations in which they would most like to learn about using computers.

Four short slide-tape shows were produced by the researcher which depicted individual or paired female talent delivering the introduction to a media presentation on computer utilization. Talent were selected who were similar to the majority of subjects in age and ethnic background. The two 14-year-old females selected as talent dressed similarly and were photographed working as individuals and also working in pairs in a computer classroom. Care was taken to duplicate the positioning, expression, and overall content of each scene as the talent was changed. An adolescent female with an articulate, pleasant voice served as the narrator. The same taped version of the narration was used in each of the treatment conditions.

To control for variables other than individual or paired presentation which might contribute to the perceived credibility of the talent, counterbalanced treatment materials were prepared. To help control for differences in physical appearance, Talent A appeared as the individual talent in one treatment and Talent B appeared as the individual talent in another treatment. The two females also appeared together in versions of the paired talent treatment. One paired version portrayed Talent A as the main or central focus of the photograph, with Talent B also appearing in the slide (Talent A/Talent B). The other version portrayed Talent B as the central figure, with Talent A appearing as the second adolescent involved (Talent B/Talent A). Controlling for order effects dictated four treatment groups in which students viewed either individual or paired presentations in differing order: 1) Talent A first, Talent B second, 2) Talent B first, Talent A second, 3) Talent A/Talent B first, Talent B/Talent A second, and 4) Talent B/Talent A first, Talent A/Talent B second. Though four treatment groups were utilized, results from the appropriate groups were combined to yield individual treatment data and paired treatment data.

Procedure

The attitudinal portion of the Minnesota Computer Literacy and Awareness Assessment, Form 8, was administered to 96 initial participants in their respective classrooms during four consecutive class periods. Taped directions were played by a female adult proctor and the regular male teachers were present in each classroom during the administration of the instrument. As was the case with all test materials, students' names and additional information had been coded onto answer sheets prior to their distribution in order to reduce the chance of errors. For both the Minnesota Computer Literacy and Awareness Assessment and the Perceived Talent Credibility scales, students marked their responses to Likert-type questions directly on computer answer sheets. Responses were optically scanned and scored, and 10% of the response sheets were hand checked and found to be accurately processed by the computer.

Statistically significant differences were found in the scores between female learners and male learners on Part I of the Minnesota Computer Literacy and Awareness Assessment, Form 8 (see Table 1). For this reason, female subjects were categorized as having positive attitudes toward computers if their scores were above 72 and negative attitudes toward computers if their scores were 72 or below. Similarly, male subjects whose scores were 76 and above were considered to have positive attitudes toward computers while male subjects with scores falling below 76 were categorized as having negative attitudes toward computers.

After female and male participants had been categorized as having positive or negative attitudes toward computers, stratified random assignment by gender and attitude toward computers was used to assign students to one of four treatment groups.

TABLE 1

Results of an Aspin-Welch t Test for Differences in Mean Scores on the Minnesota Computer Literacy and Awareness Assessment

Source	n	M	SD	df	t	p>|t|
Females	56	71.50	9.74	72.70	2.09	.040*
Males	40	76.33	12.05			

Note. Higher scores indicate more positive attitudes toward computers.

* $p < .05$, two-tailed.

Three days later, 91 students present to participate in the remainder of the study were directed to one of four classrooms where they viewed the appropriate versions of the slide-tape presentations and completed the Perceived Talent Credibility scale during their regular 55-minute class periods. Tape recorded instructions to the students were administered by adult male teachers who directed the data collection procedures in each classroom. Students in each treatment group viewed a slide-tape presentation and then answered both the multiple choice and open-ended questions regarding perceived talent credibility.

Student responses to the first presentation were collected, and each group of students then viewed the second slide-tape production. Students again answered the questions regarding the perceived credibility of the talent, as well as an open-ended question on their preferences for classroom situations in which they would most enjoy learning about computers.

Results

Main and Interaction Effects

A three-way factorial analysis of variance (ANOVA) was used to investigate whether the dependent measure, perceived talent credibility scores, was affected by learners' gender, learners' attitude toward computers, individual or paired talent, or interactions between or among these independent variables. Factor One was the gender of the learners, with two levels of this factor being female or male learners. Factor Two was the learners' attitudes toward computers, with two levels being positive or negative attitudes toward computers, as defined previously. Factor Three was the presentation of talent, with two levels being the appearance of individual or paired female talent. With alpha set at .05 and power set at .80, a medium-large effect size of approximately .30 would have been detected with the sample size of 91 subjects. No significant main or interaction effects were detected at these levels. The main effect for learners' attitude approached significance ($p=.057$). There was a consistent trend for students to assign slightly higher credibility scores to individual rather than paired talent, regardless of the subjects' gender or attitude toward computers. The combined effects of learners' gender, learners' attitude toward computers, and presentation of individual or paired talent accounted for 8.5% of the total variance in perceived talent credibility scores.

In analyzing the subscale for authority of the talent, main and interaction effects were not significant. The combined effects of learners' gender, learners' attitude toward computers, and presentation of individual or paired talent accounted for 7.4% of the variance in scores for the subscale measuring talent authoritativeness.

In analyzing the subscale for character of the talent, the main effect for learners' attitude was significant (see Tables 2 and 3) while other main and interaction effects were not. As shown in Table 2, the trend to rate individual talent as more credible than paired talent continued and was reflected in a p value of .08 for the character subscale. The combined effects of learners' gender, learners' attitude toward computers, and presentation of individual or paired talent accounted for 11.8% of the variance in scores for the subscale measuring talent character.

TABLE 2

Results of a Three-Way ANOVA for Effects on Perceived Talent Credibility Scores, Character Subscale

Source	df	SS	MS	F	p>F
Gender (A)	1	461.04	461.04	1.26	.265
Attitude (B)	1	1453.57	1453.57	3.98	.049*
Talent (C)	1	1122.02	1122.02	3.07	.083
A x B	1	308.02	308.02	.84	.361
A x C	1	91.15	91.15	.25	.619
B x C	1	20.46	20.46	.06	.814
A x B x C	1	654.19	654.19	1.79	.185
Total Model	7	4044.68	577.81	1.58	.152
Error	83	30,320.93	365.31		

Note. Type III sums of squares are reported for main and interaction effects.

*Significant at the .05 level.

TABLE 3

Mean Scores and Standard Deviations for Character Subscale Ratings of Perceived Talent Credibility by Attitude Toward Computers

Source	n	M	SD
Positive Attitudes	44	130.48	21.30
Negative Attitudes	47	123.32	17.25

Note. Higher scores indicate a greater degree of character (trustworthiness).

Open-ended Responses

In responses to open-ended questions, the most frequent reason students cited for perceiving the talent as credible was the fact that the talent had been chosen to appear in a media presentation. Because talent had been selected to appear in an instructional production, subjects believed them to be both competent and trustworthy sources of information about computers. The most frequent reason cited for not perceiving the talent as credible was lack of substantial, in-depth computer related content in the slide-tape program.

When asked whether they would rather work with a computer alone or with a friend, chi square calculations revealed a statistically significant difference between the responses of females and males. Females expressed more frequent preferences for using computers with a friend than did males (see Table 4). Females with positive or negative attitudes toward computers did not differ significantly from each other in their preferences for working on computers alone or in pairs. Seventy-three percent of all females indicated a preference for working on computers in pairs, regardless of their attitude toward computers. Males with positive attitudes did not differ significantly from males with negative attitudes, with fifty-three percent of all males indicating a preference for working on computers in pairs, regardless of their attitudes toward computers. No significant relationship was found between gender of students with positive attitudes toward computers and their stated preferences. Chi square calculations revealed a significant relationship between gender of students with negative attitudes toward computers and their preferences for using computers, with females preferring to work with a friend (see Table 5).

Discussion

Main and Interaction Effects

Several considerations are raised by the failure of the three-way ANOVA to detect significant main or interaction effects upon perceived talent credibility scores. Data indicate that the gender of the learner did not affect the perceived credibility ratings of female peer talent appearing within the context of computer instruction. Data collected in the open-ended questionnaires indicate that the fact that a particular talent had been chosen to appear in an instructional presentation contributed to the credibility of the talent. Apparently, learners of both genders were willing to believe that female talent who appeared in media presentations were both competent and trustworthy or they would not have been selected to serve as talent. Results of this study support the proposition that, in light of recent calls for computer-using female role models, female peer talent may be utilized in instructional presentations without jeopardizing the talents' credibility for female or male learners.

TABLE 4

Results of a Chi Square Test for Relationship of Gender to Computer Use Preference

	Computer Use Preference		
Gender	Alone	With a friend	
Female	14	38	52
Male	17	19	36
	31	57	88

$\chi^2 (1, N = 88) = 3.84, p < .05$

TABLE 5

Results of a Chi Square Test for Relationship of Gender to Computer Use Preference by Students with Negative Attitudes Toward Computers

	Computer Use Preference		
Gender	Alone	With a friend	
Female	4	22	26
Male	9	7	16
	13	29	42

$\chi^2 (1, N = 42) = 7.74, p < .01$

The main effect for differences in perceived credibility scores for learners with positive or negative attitudes toward computers approached significance. Statistically significant differences in scores on the character (trustworthiness) subscale were found for learners with positive or negative attitudes toward computers. These results seem to indicate that attitude toward a topic influences the credibility of a talent delivering instructional messages. Subjects with positive attitudes toward computers rated talent higher in credibility than did students with negative attitudes toward computers. Bloom (1976) stresses the importance of initial attitude toward a subject or task as a major factor influencing both cognitive and affective learning outcomes, and it appears that initial positive attitudes towards a subject may increase the credibility of the talent delivering information on that topic as well. Specifically, it appears that learners with positive attitudes toward computers perceive talent as more trustworthy than do learners with negative attitudes toward computers.

No main effect for individual or paired talent presentation was found, though a consistent trend indicated that learners, regardless of gender or attitude toward computers, rated individual talent slightly higher in perceived credibility than paired talent. One possible explanation is that learners viewed an individual talent as an expert. In paired talent versions, utilization of two people to present the information may have suggested a subtle lack of expertise on the part of each individual. Since students viewing the paired treatment versions had less variety in the visual presentations than those subjects who viewed individual versions, boredom was considered a potential reason for slightly lower credibility scores. However, credibility scores of individual talent were slightly higher than paired talent scores on the first administration of the instrument as well as on the second, discounting this possibility. Results of this study indicate that the presence of individual or paired female peer talent made virtually no difference in perceived credibility scores for eighth grade learners.

No interaction effects were found to exist. However, the median split procedure used to assign learners to groups of students with positive and negative attitudes toward computers may have obscured results which might have been found using extreme group comparisons. The current study was conducted utilizing the median split procedure as it was thought to be a more true reflection of conditions existing in actual classroom learning situations. Again, options for future research exist. Additionally, the combined effects of learners' gender, learners' attitudes toward computers, and presentation of individual or paired female talent accounted for only 8.5% of the total variance in perceived talent credibility scores. This finding indicates that other factors not investigated in this study contribute to the perceived credibility of talent appearing in instructional media presentations and suggests an avenue for further research.

Open-ended Responses

Of the subjects who did not believe the talent was credible, the majority cited the failure of the talent to provide them with substantial computer-related information as the reason for low talent credibility. Of the subjects who found the talent to be credible, the majority stated that they did so because they had learned something about computers from the presentation. Research (Andersen & Clevenger, 1963; Bowers & Phillips, 1967; Brock, 1965) indicates that the inclusion of specific content into the treatment presentations may introduce extraneous variables into the ratings of perceived talent credibility, therefore the slide-tape treatments had been designed to be as free from specific computer-related content as possible. Data from the open-ended questionnaires support the contention that the informational content of an instructional message will influence the perceived credibility of the talent and that viewers may judge the credibility of the talent by comparing what the talent says to the learner's personal expertise.

Viewing individual or paired talent presentations had no relationship to students' stated preferences for working with computers alone or with a friend as indicated in open-ended responses. However, responses to the questions did suggest that students' gender and attitude toward computers were related to their preferences for working alone or in pairs. Female students, in comparison to male students, were found to express a statistically significant preference for working on a computer with a friend. This relationship appeared to be most influenced by female learners with negative attitudes toward computers. Females with negative attitudes, in contrast to males with negative attitudes, expressed a significant preference for learning about computers with a friend. Gender was not related to preferences of students with positive attitudes. These findings lend support to the idea of teamwork as a proposed educational intervention for encouraging females to participate in computer learning activities (Sanders, 1985; Sanders & Stone, 1986) and suggest that working in pairs may be an especially attractive option for females with negative attitudes toward computers. Further research in this area is warranted.

Summary

Results of this study indicate that adolescent females used as talent in visual presentations on computer use were viewed as credible by both female and male subjects. Both female and male subjects found adolescent female talent to be competent and trustworthy, although subjects who had positive attitudes toward computers rated female adolescent talent as more trustworthy than did subjects who had negative attitudes toward computers. Visual presentations depicting female adolescents working with computers either individually or in pairs made virtually no difference in ratings of talent credibility, though self-reported data indicate that females with negative attitudes toward computers expressed a significant preference for engaging in computer activities with a friend rather than alone. These results suggest that adolescent females may be used effectively as peer talent when educators design and utilize visual presentations for computer instruction. Additional research is needed to determine more specific effects of talent credibility upon cognitive and affective learning outcomes when computers are the subject of instruction.

References

Andersen, K., & Clevenger, T., Jr. (1963). A summary of the experimental research in ethos. Speech Monographs, 30(2), 59-78.

Anderson, R. E., Klassen, D. L., Krohn, K. R., & Smith-Cunnien, P. (1982). Assessing computer literacy -- Computer awareness and literacy: An empirical assessment final report. St. Paul, MN: Minnesota Educational Computing Consortium.

Bandura, A. (1969). Social-learning theory of identificatory processes. In D. A. Goslin (Ed.), Handbook of socialization theory and research (pp. 213-262). Chicago, IL: Rand McNally.

Bandura, A. (1977). Social learning theory. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A., & Walters, R. H. (1963). Social learning and personality development. New York: Holt, Rinehart & Winston.

Bloom, B. S. (1976). Human characteristics and school learning. New York: McGraw-Hill.

Bowers, J. W., & Phillips, W. A. (1967). A note on the generality of source-credibility scales. Speech Monographs, 34(2), 185-186.

Brock, T. C. (1965). Communicator-recipient similarity and decision change. Journal of Personality and Social Psychology, 1(6), 650-654.

Campbell, P. B. (1984). The computer revolution: Guess who's left out? Interracial Books for Children BULLETIN, 15(3), 3-6.

Cantor, J. R., Alfonso, H., & Zillman, D. (1976). The persuasive effectiveness of the peer appeal and a communicator's first-hand experience. Communication Research, 3(3), 293-310.

Conger, J. J. (1973). Adolescence and youth: Psychological development in a changing world. New York: Harper & Row.

Elmer-DeWitt, P. (1986, November 3). From programs to pajama parties. Time, p.88.

Fleming, M., & Levie, W. H. (1978). Instructional message design: Principles from the behavioral sciences. Englewood Cliffs, NJ: Educational Technology Publications.

Horn, J. C. (1985, July). Man, woman, and computer: Interest matters. Psychology Today, p. 13.

Jones, M. H. (1983). Sex differences in achievement on cognitive dimensions of computer literacy and in attitudes toward computing and computers. Dissertation Abstracts International, 44(12), 3620A. (University Microfilms No. 84-02875)

Kimmel, D. C., & Weiner, I. B. (1985). Adolescence: A developmental transition. Hillsdale, NJ: Lawrence Erlbaum Associates.

Lockheed, M. E. (Ed.). (1985a). Women, girls, and computers [Special issue]. Sex Roles, 13(3/4).

Lockheed, M. E. (1985b). Women, girls, and computers: A first look at the evidence. Sex Roles, 13(3/4), 115-122.

Lueptow, L. B. (1984). Adolescent sex roles and social change. New York: Columbia University Press.

McCroskey, J. C. (1966). Scales for the measurement of ethos. Speech Monographs, 33(1), 65-72.

Moursund, D. (Ed.). (1984). Computer equity [Special issue]. The Computing Teacher, 11, (8).

Pearson, J. C. (1982a). Gender, similarity and source credibility. Denver, CO: Western Speech Communication Association. (ERIC Document Reproduction Service No. ED 213 063)

Pearson, J. C. (1982b). The role of gender in source credibility. Louisville, KY: Speech Communication Association. (ERIC Document Reproduction Service No. ED 226 390)

Reece, M. J., & Owen, S. V. (1985). Bloom revisited: A school learning model of computer literacy. Journal of Educational Computing Research, 1(1), 23-35.

Sanders, J. S. (1985). Making the computer neuter. The Computing Teacher, 12(7), 23-27.

Sanders, J. S., & Stone, A. (1986). The neuter computer: Computers for girls and boys. New York: Neal-Schuman.

Schau, C. G., & Scott, K. P. (1984). Impact of gender characteristics of instructional materials: An integration of the research literature. Journal of Educational Psychology, 76(2), 183-193.

Schau, C. G., & Tittle, C. K. (1985). Educational equity and sex role development. In S. S. Klein (Ed.), Handbook for achieving sex equity through education (pp. 78-90). Baltimore, MD: Johns Hopkins University Press.

Schubert, J. G. (1984). Females and microcomputer use in school: Some insight into traditional patterns. New Orleans, LA: American Educational Research Association. (ERIC Document Reproduction Service No. ED 244 598)

Schunk, D. H. (1987). Peer models and behavioral change. Review of Educational Research, 57(2), 149-174.

Scott, K. P., & Schau, C. G. (1985). Sex equity and sex bias in instructional materials. In S. S. Klein (Ed.), Handbook for achieving sex equity through education (pp. 218-232). Baltimore, MD: Johns Hopkins University Press.

Sealfon, P. (1986, December 15). Fighting the computer gender gap. American Way, pp. 54-57.

Weitzman, L. J. (1979). Sex role socialization: A focus on women. Palo Alto, CA: Mayfield.

Sparking Learning in Middle Schools with Interactive Videodiscs

Lisa Novemsky, Howard Kimmel and Mark O'Shea

Curricula throughout the country are being transformed by new imagery technology, and by the computer. New video technology offers easy access tools for calling up, altering, sequencing, and programming high resolution visual images, alone, or in combination with audio and/or computer generated text. It is apparent that these technologies are going to make inroads into our school systems at lower and lower grade levels, altering classroom learning strategies as they move in. It is essential that these new technologies be integrated into our schools in a humane and sensitive manner that emphasizes rather than supplants the quality of human interactivity. The magical ability to call high quality images to the screen at the learner's own pace and sequencing is one of the gifts of modern technology. A readily available technology which provides for this is the interactive videodisc (IVD) system.

IVD systems can be integrated into already existing educational systems in a simple, inexpensive, effective manner. A videodisc is a sturdy shiny white disc with a hole in the middle which resembles a phonograph record. It is "played" by a low power laser beam rather than a phonograph needle. The disc is a random access medium with a capacity for storing 54,000 frames on each side. These frames can be used as stills or they may be used for motion sequences.

Making electronic imaging available to science educators in a system that can be controlled by the learner has vast potential. In the hands of a skilled and sensitive science educator and/or learners who are turned on by the magical nature of the new tool, the learning process can come alive. Many methods of teaching and learning stifle imagination, sensitivity, independence and resourcefulness. Centering science learning around imagery which puts the learners at the controls can provide for an amazing awakening of enthusiastic participation in the learning process.

Although videodisc technology is available and popular in the military, government and industry in expensive, sophisticated high technology forms, it is also available in very inexpensive, simple-to-use flexible versions. At the simplest level which is known as level one, a laserdisk player can be directly connected to a monitor and serve as a "souped-up" slide projector and/or VCR. This form is useful in the classroom and is more convenient than a slide projector in terms of its enormous storage capacity and rapid random access capability. It is more than a VCR in terms of high resolution and the ability to stay on any one frame without damaging the medium. The remote control keypads are similar to those that control the VCRs, with slow motion, fast scans, and often programmable memories.

The addition of a microcomputer to the equipment used in level one systems raises the configuration to level three. The Apple IIe computer, available in most schools is adequate for sthis task, as are many other micros. The micro is interfaced with the player which can then be controlled by simple commands. Computer-generated text and graphics can now be created and integrated into the visual display. The sequences can be stored on floppy discs. One of these practical low-cost interfaces is manufactured by Optical Data Corporation. The Laserwrite authoring system which accompanies this interface allows learners, young and old, gifted and learning disabled, to interact with the system and to create their own unique programs. Learning to use the authoring system is a minimal task which can be accomplished in a few hours.

In the hands of experienced teachers and energetic imaginative young learners, technology in replacing traditional education with alternate forms, can be a facilitator to bring the educational system back to life.

There is a reluctance and/or fear of using computers in many elementary and secondary school teachers. The fearless explorative behavior of the young can be harnessed as the catalyst to overcome the teacher´s fear, and free her/him to join in the experiment with the new technologies. The videodisc, with its versatile storehouse of accessible images and two-channel audio is a perfect vehicle for such a partnership of technologies. In this presentation, I will describe projects for joining computers and videodiscs to produce Interactive Videodisc systems which are learner-authored and learner-controlled. These middle school IVD projects involve Apple computers which control the players with simple authoring systems. The IVD system is transformed into a visual learning playground in which the learner can experiment with a potpourri of related images while creating meaningful text. Individualized creativity and imagination are encouraged, and projects become real world processes, alive with high resolution imagery, rather than stale repetitive exercises.

A pilot project to introduce IVD to middle schools is in its third year in New Jersey. New Jersey Institute of Technology's Center for Pre-College Programs, supported by the New Jersey Department of Higher Education has been working with several local middle school science teachers. The project is an exploration of the capabilities of this new technology for middle school science classes. One project was developed by eigth graders on the then timely subject of Halley's Comet. One teacher has been helping special education students create their own space trips. A schoolwide commemoration of the Challenger disaster used video discs as a special attraction. This year the teachers and NJIT staff are in the process of designing and videotaping our own disc.

New Jersey Institute of Technology (NJIT) has been developing interactive videodisk technology for the educational community. In one project, this new technology is being developed cooperatively by the university and several middle schools. This pilot program was integrated into an already existing network of New Jersey middle school science teachers and teacher-educators who meet in-person occasionally but are also linked for continuous electronic communication on NJIT's electronic teleconferencing system. Through a grant from New Jersey's Department of Higher Education, NJIT's Physics Department obtained Apple-based IVD systems which were loaned to the project and put in several of the home schools. At present NJIT is producing a physics disk and the middle school teacher's project is producing a disk about marine science.

This project is a small part of a middle school science teaching project which is centered at NJIT. Participating teachers from various communities throughout the state are linked electronically for teleconferencing with each other and college professors via the Electronic Information Exchange System, a state-of- the-art electronic communications system based at NJIT.

We acknowledge the cooperation and support of the New Jersey Department of Higher Education, NJIT´s Physics Department, NJIT´s Instructional Media Center, Optical Data Corporation, and contributors to the Center for Pre-College Programs.

Use of Graphics to Conceptualize Meaning in Language Arts CAI

Richard Sinatra

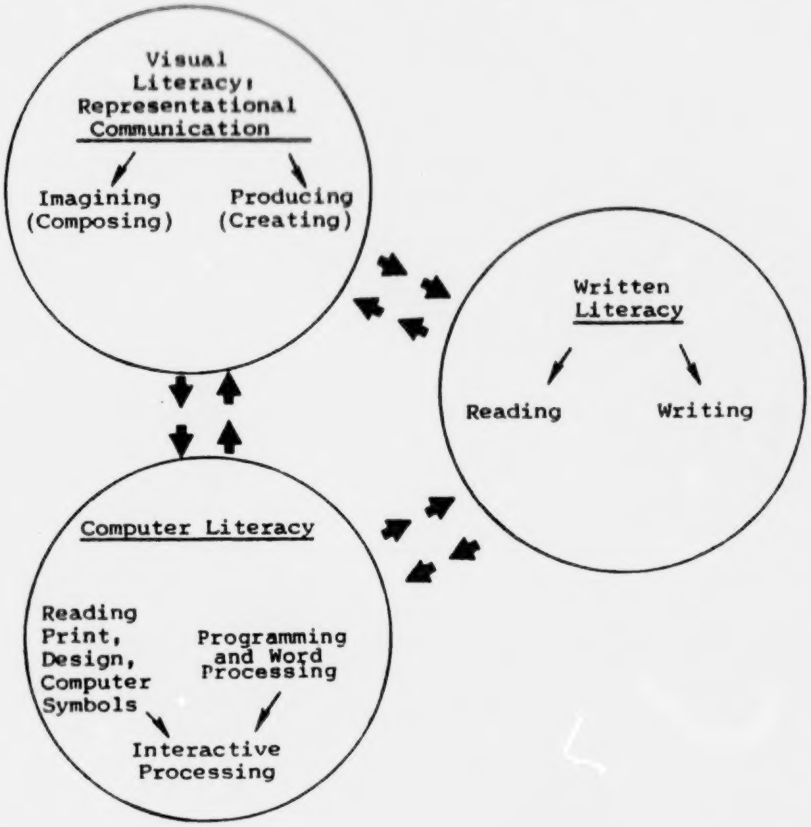
In more modern Computer Assisted Instruction (CAI) programs, particularly those marketed for use in the Language Arts, the computer's potential to influence thinking has been heightened by the skillful use of graphics. Pictures and graphic designs are programmed with text to assist students in the very conceptualization of content in which they are engaged in learning. This usage contrasts with that of animation in earlier drill and practice and tutorial programs where pictures provided an amusement or entertainment value. Dalgish (1987) has critized such use of graphics in software in two ways. First they can be likened to arcade game usage whereby they fail to reinforce or make a point about the subject matter. Secondly, they cannot be controlled by the student while the student is engaged in learning a particular point. The student must wait until the graphic display is over before resuming with the actual content of the program.

Both Bork (1980) and Sinatra (1986) suggest, however, that graphic interaction in CAI programs can enrich and extend student experiences. Bork (1980)writes:

> Thinking about these alternate modes, and their uses, leads us to one of the most valuable contributions of iconic representation in learning, the building of student intuition or insight. This is an extremely important goal of traditional school and university education, and one that is difficult to reach by most of our current modes of learning. The intuition we develop in everyday life comes from the rich collection of phenomena we experience as children. But as we move to more and more abstract areas, everyday experience becomes less and less relevant. With computer graphics we can extend these experiences. (pp. 68-69)

Sinatra (1987) has presented a model which shows how computer usage can interface with the verbal and visual literacies. The model suggests that an interactive relationship exists for uses of CAI programs. This interactive relationship is mediated by each user's fluency with the written literacy modes of reading and writing and by his/her conceptualizing and creating abilities in nonverbal, visual literacy modes. When engaged in CAI programs, users must read print, graphic and design displays, and program language statements while during expressive language functioning required during word processing or programming, the user keys-in print and symbols while imagining and/or creating a particular topic.

MODEL SHOWING HOW COMPUTER USE WITH CAI PROGRAMS
INTERACTS WITH WRITTEN AND VISUAL LITERACIES


Visual Literacy: Representational Communication
Imagining (Composing)
Producing (Creating)
Written Literacy
Reading
Writing
Computer Literacy
Reading Print, Design, Computer Symbols
Programming and Word Processing
Interactive Processing

PICTURE INTEGRATION

Pictures used in the CAI program formats of interactive fiction and collaborative story making, text adventures, and simulations are used to communicate the same levels of meaning as in traditional text. Becker (1978) maintains that there are two such levels in picture usage. The first level occurs from the representation that the picture literally conveys, that is, most objects depicted are meaningful in and of themselves. The second level occurs through the organization and arrangement of pictures to suggest particular meanings.

In the interactive fiction programs, called Microzine and the Tales Series, provided by Scholastic Inc. (P.O. Box 7502, 2391 E. McCarty St., Jefferson City, MO 65102) pictures are integrated within the development of tales youngsters are creating. The pictures, therefore, reinforce the meaning of text and appear at appropriate times to heighten interest in the tale. In a somewhat different way, young children or disabled readers design a computer pet in the computer program called Computer Crosswoods (Educational Activities, Inc., Freeport, N.Y. 11520). The pet visually created by youngsters from parts displayed on the screen, soon becomes lost at a circus, zoo, or amusement park. Students journey through one of the three adventures by making decisions about where and how to find the lost pet. Also, marketed by Educational Activities (Freeport, N.Y., 11520) is the computer program, the Storyteller. Here illustrations are provided while the student is developing the tale so that reading, word processing (writing), and graphic interaction occurs in each student's personalized story.

Two programs by Spinnaker Software Corporation (215 First Street, Cambridge, MA 02142), Newsroom (Springboard Software, Inc., 7807 Creekridge Circle, Minneapolis, MN 55435), and Explore-A-Story (Collamore, D.C. Heath, 2700 N. Richmond Ave., Indianapolis, IN 46214), provide good examples of how picture displays help students organize thought during reading and writing activities. In Story Machine the use of full color graphics, sound and a supplied list of words encourage students to write sentences, paragraphs, and simple stories. For example, a beginning reading or severely reading disabled student could type the sentence, "The boy walks to the tree" and the screen will pictorially act out the sentence. With Kidwriter, students create their very own original picture stories first by choosing from 99 different characters and objects. Then students type in the verbal story that complements the picture story they have created.

Explore-a-Story features the opportunity for young children to change animated characters on a single screen and encourages students to print their picture/verbal stories. Look at the following options available on the Menu Bar of Explore-A-Story that young children can select to create original verbal/visual stories:

Each picture box or "icon," represents a specific function you can perform.

Characters	Allows you to add animated characters to your scene.
Objects	Allows you to add objects to your scene.
Backgrounds	Allows you to change the scenery or background.
Labels	Allows you to place prewritten words in your scene.
Disk Functions	Allows you to load new files, save scenes, clear the screen, and access **Set Up** and **Disk Utilities.**
Print	Allows you to print existing or new scenes in black-and-white or color.

Simulations and text adventures attempt to involve students in real life situations. They encourage role playing, problem solving through relevant sampling of cues, the testing of hypothesis, and the provision of consequences as they might occur in the real world. Frenzel (1980) suggests that within simulations, the computer is programmed to approximate the the behavior of people or systems, and students interacting through the simulation can test out alternative behaviors and strategies to discover their likely effects. In the exciting simulations of Santa Fe Trial, Lincoln's Decisions, Washington's Decisions, and Annam, (all distributed by Educational Activities, Inc., P.O. Box 461, Coram, N.Y. 11727), the student must make high level projections, judgments, and decisions. In the Santa Fe Trail, the student becomes a trader in the years of the developing west and must make numerous intelligent decisions prior to and during the journey in order to deliver his/her goods to market in Santa Fe, New Mexico. Pictures and maps showing the major trials across the west help students conceptualize the decisions that were made by our early pioneers and leaders.

The major format of the CAI program Information Connection (Grolier Educational Corporation, Sherman Tpke., Danbury, CT 06816) is the simulation experience of going on line to practice telecommunications. A rather lengthy tutorial was made more vivid and understandable by the interactive use of pictures. The four major componnents of telecommunications - the student's personal computer, the host computer, the telephone line, and the modern wire were displayed throughout the verbal tutorial.

USE OF DESIGN AND CONFIGURATION

Composition planning and production CAI programs and programs that serve as tools to help students manage and organize information often use design and graphic configurations to influence student's thinking. This is where graphs, diagrams, timelines, spreadsheets, flowcharts, and networks are used.

Grolier Electronic Publishing Company has many fine products in this category such as GraphMaster, InforMaster and EduCalc. Graphmaster teaches students the power and rationale for using three types of graphs: the pictograph, the bar graph, and the pie graph. Students can enter up to six variables for the picto and bar graphs and up to eight variables for the pie graph to visually and quantitatively portray relationships they research or discover in their textbooks. Informaster teaches the concepts of data base management. Students learn the meaning of a file, a record within a file, and a field within a record. After a tutorial and simulated practice are completed, students can enter, sort, interrelate, and recombine information in a variety of ways to suit their research purposes and needs. EduCalc, featuring a built-in-calculator, shows students how to apply spreadsheets in their school subjects. Students can create, edit, save, and print spreadsheets from 26 columns wide by 99 rows long. Students learn how to manage and manipulate data and can visually see how the quantitative change of one cell (the interaction of row and column information) has a ripple effect on all the other variables in their spreadsheet.

Students can design and create signs, banners, greeting cards, and other menu options afforded through Print Shop (Learning Arts, P.O. Box 179, Wichita, KS 67201) to produce complete message contexts. The message is projected not only through the amount of text typed in by the designer but also by the selection of fonts, borders, and graphic displays which lend an affective, personalized style to the message. The Newsroom program (Springboard Software, 7807 Creekridge Circle, Minneapolis, MN 55435) establishes the whole of the newspaper format in which all students' articles are a part. Using displays of five type sizes to highlight relative importance of ideas and selecting from over 600 pieces of art or design to integrate with their written messages, students control all the design elements of the newspaper they are creating for class, school, or community use.

One program uses graphic configurations in a unique, interactive way. In Thinking Networks for Reading and Writing (Think Network, Inc., P.O. Box 6124, N.Y.C., N.Y. 10128), graphic displays known as semantic networks or semantic maps help students understand, plan and write according to the various styles of written discourse. The comprehension work completed during network building shows students how the major and minor ideas of a reading selection are related to each other. Then, using the network configuration alone to show how major and minor ideas will be developed in a forthcoming composition or essay, the student writes or word processes an original work.

For example, the network configuration shown in Figure 3 on the next page portrays the organization of narration or story telling. The marginal notes show the type of thinking students accomplish as they figure out a story's main idea, episodic events, or sequential happenings or as they lay out the information for an original composition.

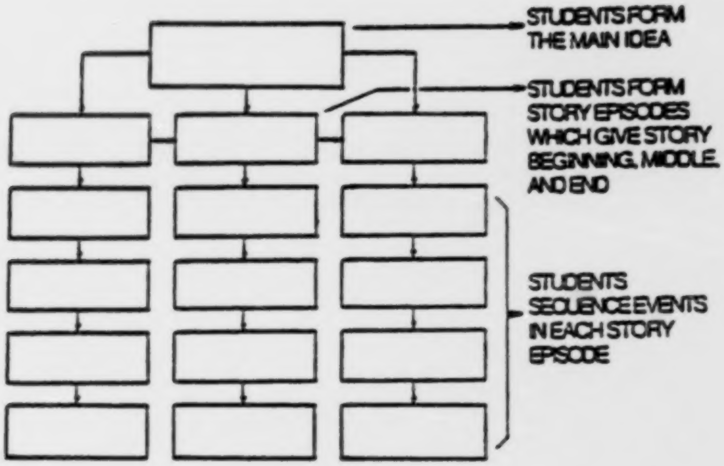

STUDENTS FORM THE MAIN IDEA
STUDENTS FORM STORY EPISODES WHICH GIVE STORY BEGINNING, MIDDLE, AND END
STUDENTS SEQUENCE EVENTS IN EACH STORY EPISODE

FIGURE 3: Network configuration and type of thinking for narrative organization.

The next network configuration illustrated in Figure 4, on the other hand, portrays the relationship of a different type of thinking necessary in written organization. This organization is more suitable for a content area report which is describing features or parts of a general theme. The central idea or thesis (in the middle) is supported by paragraphs of information (shown as four information groups) which contain specific factual information (shown as 3 nodes related to each information group).

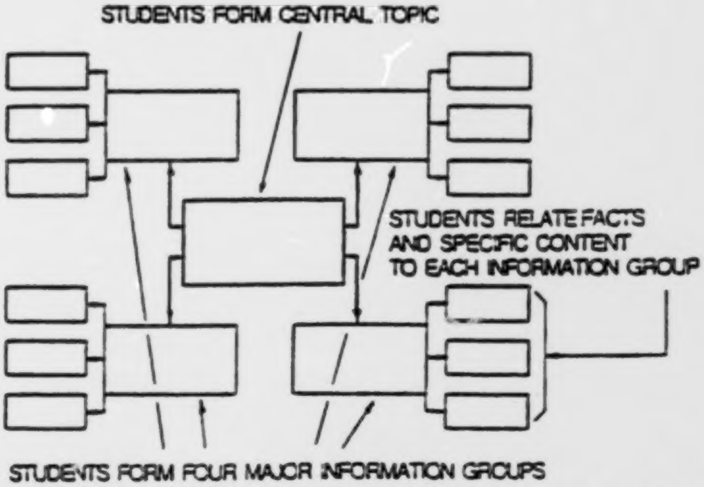
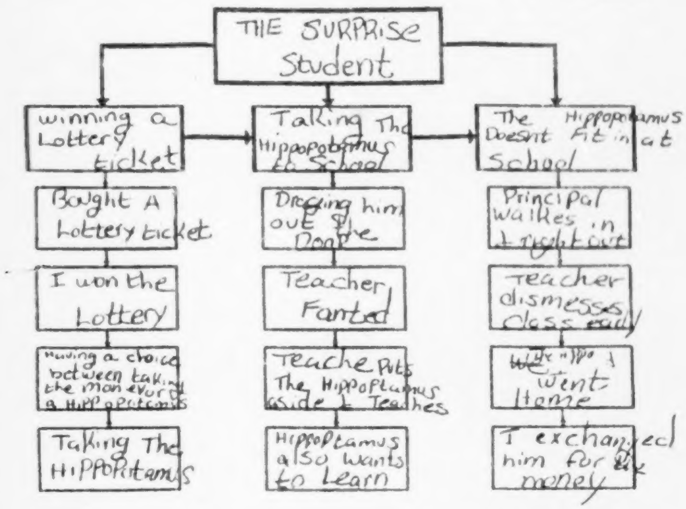

STUDENTS FORM CENTRAL TOPIC
STUDENTS RELATE FACTS AND SPECIFIC CONTENT TO EACH INFORMATION GROUP
STUDENTS FORM FOUR MAJOR INFORMATION GROUPS

FIGURE 4: Network configuration and type of thinking for theme reports.

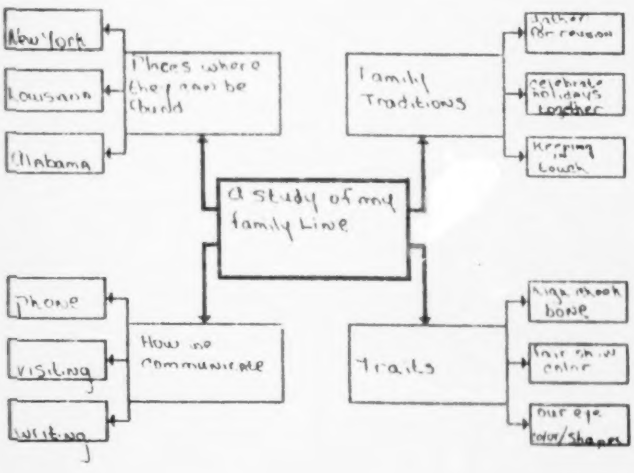
How two youngsters, fifth-grade Nicole, and seventh-grade Akisha, constructed maps in preparation for word processing is illustrated in the next two figures. Nicole had worked on her story, "The Surprise Student", for three previous network drafts before she was satisfied with her final draft. The reader can see how she constructed her three story episodes, each having a different setting and time structure. Akisha had begun one previous network draft of her selection, "A Study of My Family Line", before completing her network. The reader will notice that she probably did her research by interviewing her family members rather than using text sources. Both girls then used their network plans to write and word process their selections into completed compositions.

Part 4: Creative Writer

FINAL DRAFT


THE SURPRise Student
winning a Lottery ticket
Talking The Hippopotamus to School
The Hippopotamus Doesnt Fit in at School
Bought A Lottery ticket
Dragging him out the Door
Principal walkes in + right out
I won the Lottery
Teacher Fanted
Teacher dismesses class early
Having a choice between taking the mon ev or a Hippopotamus
Teache Puts The Hippoplamus aside + Teaches
We the hippo + I went Home
Taking The Hippopitamus
Hippoptamus also wants to Learn
I exchanged him for the money

PART 4: Creative Writer **Theme Network Card**


New York
Lousiana
Alabama
Places where they can be found
Family Traditions
gather for reunion
celebrate holidays together
Keeping in touch
a study of my family Line
Phone
Visiting
Writing
How we communicate
Traits
high cheek bone
fair skin color
our eye color/shapes

This paper has shown that many types of CAI programs both stimulate and integrate visual and verbal literacies. The technology of program animation allows learners to see a conceptual point being made, moments before or after the learner has read information explaining the same concept on the screen. Thus, if the read information has been poorly understood, the graphic display will enrich and extend the learner's experience. In actuality, such integration of written and visual literacies, reinforces the acquisition of each to a higher degree. But, as suggested earlier in this paper, as intuition and insight become farther and farther removed from the first-hand experiences of learners, computer graphics can provide a source of learning to make concepts more understandable and relevant.

REFERENCES

Becker, S. (1978). Visual stimuli and the construction of meaning. In R. Bikkar & W. Coffman (Eds.), *Visual learning, thinking, and communication*. N.Y.: Academic Press.

Bork, A. (1980). Interactive learning. In R.P. Taylor (Ed.), *The computer in the school*: *Tutor, tool, tutee*. N.Y.: Academic Press.

Dalgish, G.M. (1987). Some uses of computers in teaching English as a second language: The issue of control. In J.S. Blanchard & G.M. Mason (Eds.), *The computer in reading and language arts*, N.Y.: Haworth Press.

Frenzel, L. (1980). The personal computer - Last chance for CAI? *Byte*, 5, 86-96.

Sinatra, R.C. (1986). *Visual literacy connections to thinking, reading and writing*. Springfield, Ill.: Charles C. Thomas.

SECTION II

VISUAL LITERACY AND TECHNOLOGY

Videodisc Visuals for Learning Physics

Ronald Gautreau, Harpreet Chawla, Yi-Sang Chen, Jinh-Fa Jan, Chaerng-Piao Lee, Shuenn-Tyan Lee, and William Savin

I teach physics, and I think what I teach is extremely exciting. After all, I talk about what makes the world go around--literally. I tell how Newton's three laws of motion describe the behavior of things such as projectiles, blocks sliding along inclined planes, objects bouncing off each other, spinning tops, and the like. And when you couple Newton's three laws of motion with Newton's law of universal gravitational attraction, the entire cosmos begins to be comprehensible--the moon revolving about the earth, the earth revolving about the sun, our whole solar system moving through the Universe. All of this is understandable from what Newton has told us. To me, this is an illustration of the ultimate that the human intellect can achieve.

I look out at my audience as I am describing these wondrous things, which takes time, mind you, and I don't understand why I see faces yawning, and even sometimes falling asleep.

But they are there. Year after year after year. Those masses in the classroom--the "average" student who has to take my physics course because it is required. I wish I could get inside their heads and let them take away from their college experience a bit of the inspirational message of physics.

Well, now I think I can. A new technology is making its way into the educational scene that has as its base something that has proved from around fifty years of experience to have the power to influence profoundly the way the masses think. Television!

Not just ordinary broadcast television, mind you. I am talking here about a specific television based technology called interactive videodiscs. IVD for short.

Let me contrast. When I teach the relations between impulse and momentum in a classroom, I talk among other things about a body's colliding with a wall and rebounding, and I draw chalk figures on a blackboard illustrating this. With an IVD, I can show a video picture of a real car colliding with a real wall. The learners in my classroom see metal scrunching and glass flying as the car is destroyed when it smashes into a wall. I think this conveys much more vividly the effects of the impulse of forces on an object than what I am capable of illustrating in front of a blackboard.

Moreover, I can move the 54,000 videodisc visuals quickly at will with the videodisc keypad. I can go forth, or back, in regular speed or in slow motion, or stay on a clear undistorted image as long as I desire, as I tell my students what's going on with what they are seeing. I can show them the initial moment the car contacts the wall, the time interval during which the wall exerts a force on the car, and the not so clear moment when the wall loses contact with the car.

If I really want to get fancy, I can control the videodisc images with a computer, and show expository text or questions along with the videodisc images. The sophistication of computer involvement varies. In one of the simplest computer applications, the computer is used as an electronic "page turner," taking the learner from one set of videodisc visuals to another. In a more advanced situation, the computer asks the learner questions about the material being viewed, either on a separate television screen or on the same screen with the questions strategically superimposed on top of the videodisc visuals, depending on the type of IVD equipment.

At NJIT we are using IVDs to extend learner interaction beyond the question-and-answer format. IVD technology allows learners to make actual physical measurements. For example, using computer-generated overlaid "measuring instruments" such as distance scales and clocks, students measure the distance versus time evolution of moving objects like cars crashing into other cars and objects falling on the moon. Our students then analyze the motions by using the computer coupled to the IVD for plotting graphs, solving equations, etc. The analyses are swift, allowing students to change variables quickly and see the new outcomes of the changes. Thus far our IVDs have been developed on Digital Equipment Corporation's "Interactive Video Information System," but we intend to extend our work to other IVD systems.

IVDs offer a new way for learners to perform physics laboratories. In prototype laboratories we have developed, a learner is greeted with entertaining music from the videodisc as he or she chooses from menu items involving an impulse and momentum experiment of an automobile colliding with a wall. These are

1. Registration
2. Object and Preview
3. Theory
4. Procedure
5. Experimentation
6. Data Analysis
7. Calculations
8. Results and Conclusions
9. Applications

In each section, videodisc images are interwoven with computer-generated graphics, so that the learner interacts with videodisc images of real objects while learning physics. For example, in the above Applications section the learner sees dummies smashing dramatically through windshields, and finds out how the physics just learned in the experiment can save lives with seatbelts and air bags.

I am joyful about the way I can use videodisc images in the classroom to teach physics. Automobiles colliding with walls or other automobiles dramatically illustrate the effects of impulse and momentum. An astronaut dropping a hammer and feather on the moon repeats Gallileo's finding that all freely falling bodies fall at the same rate in a vacuum. When an astronaut plays with a gyroscope in a gravity-free spaceship, the physics of angular momentum is easily seen. Trying to change his location, an astronaut contorts mightily in the middle of a space ship, but in vain because he originally had zero linear and angular momentum. An example that is especially dear to me because my area is General Relativity is the picture of astronauts and objects "falling" in an accelerating rocket reference frame, showing Einstein's Principle of Equivalence that gravity and acceleration are equivalent. [1]

The basic videodisc keypad allows me to talk over, around, or under videodisc images in a classroom in an extremely effective manner. And with a videodisc coupled to a computer, learners of physics can make honest to goodness physics measurements from the videodisc images, using the coupled computer to analyze their measurements.

I believe that IVDs will prove to be a tremendous asset in teaching physics (and other subjects), and look forward to being a part of IVD educational development. Our IVD work has been described in many forums [2-8], and our Interactive Videodisc Center has become a resource area where people can come to learn about IVDs. We welcome inquiries.

Acknowledgement

We gratefully acknowledge a SIG grant from the Digital Equipment Corporation that made much of this work possible.

References

1. The images described here are from the following commercially available videodiscs:
"Physics and Automobile Collisions" by Dean Zollman, published by John Wiley and Sons, Inc., New York, NY.
"SpaceDisc 5--Astronomy" and "Encounters" published by Video Vision Associates (now called Optical Data Corporation), Florham Park, NJ.
2. Gautreau, Ronald, "Simple Interactive Video Disc Experiments on Motion in Physics," Proceedings of the 27th International Association for the Development of Computer-based Instructional Systems Conference, p. 168, New Orleans, LA (1986).
3. Gautreau, Ronald, et al, "Physics Experiments on Interactive Video Discs," Proceedings of the 28th International Association for the Development of Computer-based Instructional Systems Conference, p. 503, Crystal City, VA (1986).
4. Chawla, Harpreet, et al, "Physics Laboratory Experiments Using Interactive Videodiscs," Proceedings of the 1987 Eastern Simulation Conference of the Society for Computer Simulation, Orlando, FL (April, 1987).
5. Gautreau, Ronald, et al, "Videodiscs in Physics Education, Proceedings of the International Conference on Computer Assisted Learning in Post-Secondary Education--LEARNING IN FUTURE EDUCATION, The University of Calgary, Calgary, Alberta, Canada (May, 1987).
6. Gautreau, Ronald, et al, "Interactive Videodisc Laboratories," 1987 American Society for Engineering Education Annual Conference Proceedings, p. 1955, Reno, Nevada (June, 1987).
7. Gautreau, Ronald, et al, "Learning Physics from Interactive Videodiscs," ELECTRONIC IMAGING '87 International Electronic Imaging Exposition & Conference, p. 917, Boston, MA (November, 1987).
8. Gautreau, Ronald, et al, "Design of an Interactive Videodisc for Physics Experiments," ELECTRONIC IMAGING '88 International Electronic Imaging Exposition & Conference, Anaheim, CA (March, 1988).

Interactive video in the Classroom

Merton E. Thompson

Like many university classes, the basic photography class that I teach at the University of Wisconsin-Stevens Point began with a traditional approach to the delivery of the information. There was heavy dependence upon textbook readings by the students; classes consisted of lectures supported by visuals; and grading was based upon a combination of exams and students assignments.

One of the first indications that there were flaws in the system was in the quality of the student assignments, particularly the early assignments in the class. While some students passed in assignments of excellent quality, others turned in assignments that did not meet even the most basic criteria. Observations of students working on the projects, and discussions with them demonstrated that this range of quality was not attributable entirely to student motivation and interest in the class. It was often the students turning in the poorest assignments who were putting forth the most effort and asking the most questions during and after class.

A survey of the students enrolled in the class indicated that there was a wide range of experiences and knowledge of photography. Some students had no previous experience in photography in general while others had considerable experience in one or more specific topics. In most cases the students with experience lacked information in specific topics covered by the course or had gaps in their understanding of the subject and its applications.

Determining how to deal with this range of student knowledge became the focus of my attention. It soon became evident that a change in the pacing of the information presented in class would not sufficiently solve the dilemma. Slowing the pace to ensure that all understood each concept before moving on to the next tended to produce comments of "boring" or "too much time spent on small details." Speeding up the delivery of information left more of the students confused and frustrated.

The logical step seemed to be to provide supplemental materials that students could use as appropriate to help themselves understand and apply a particular concept or topic. The decision was made to produce a series of self-instructional booklets covering the procedures and concepts which were taught during the first part of the class. A series of booklets covering such topics as loading film into developing tanks, developing film, and operating an enlarger were designed. These booklets were then produced using photographs of the facility in combination with printed information. In addition a series of handouts of more generalized information was created for the students. These helped to fill the gap between information in the textbook and the very specific information contained in the booklets.

Student reaction was immediate and positive. The booklets and handouts were of great assistance to inexperienced students because they now had immediate access to the specific information needed. More experienced students quickly perused the information to ensure that they were familiar with all the steps or concepts involved. As a result more class time was devoted to an in-depth study of photography and to expanding the experience and knowledge base of all the students.

However, limitations of the booklets soon became evident. First, they were very labor intensive to produce. Based upon class size it was determined that four or five copies of each booklet would be necessary. This was too small a number for any type of printing service, so each booklet was put together individually, printing the photographs and dry mounting them next to the text, then laminating the pages and assembling the booklet. Nearly as soon as the booklets were assembled, the need for revisions became necessary because of changes in procedures or equipment in the lab. Revising the booklets became an annual event and often amounted to virtually starting over.

A second limitation was the lack of feedback provided to the students as they worked their way through the booklets and the handouts. It was relatively easy for less motivated students and those working against the pressure of the clock to assume that they understood and could successfully use the concepts and procedures presented. It was often after an assignment was completed and evaluated that it became obvious to the student that he/she did not have a full grasp of the information. Without an immediate check on comprehension, too often students were misled into believing that they understood the material and could apply it appropriately.

While the booklets were a step in the right direction, it was clear that they did not satisfactorily solve the problems. At about this time, I was developing a knowledge of the applications of the microcomputer to instruction. It seemed that the microcomputer might be of assistance in solving some of the problems associated with the class. Therefore, the use of a simple authoring system was undertaken. The authoring system chosen is called Study Guide. It allowed the writing of multiple choice, matching, and fill-in-the-blank questions covering any content. The students, in turn, worked their way through the questions as their schedules permitted and as topics were presented in class. Each question was categorized into a topic area of the course. Each topic introduced in the class had an accompanying series of questions that covered the major concepts of the topic.

Students were encouraged to work through the questions after each topic was introduced and discussed in class. The program provided immediate feedback as the students answered the questions. Questions answered incorrectly were repeated by the program. The program also kept score for the students and those who completed less than 80% were prompted to repeat the questions at another time. This level of competency was adjustable according to the desires of the instructor. Records were also maintained for the instructor on each of the students and their scores.

The addition of the authoring system was well received by the students. Many students enrolled in the class had had no previous experience with a microcomputer. But most found this introduction a pleasant one and they quickly overcame any initial fears of the computer. Experienced microcomputer users also found the application useful and helpful assistance in the class.

Students particularly enjoyed the ready availability of the information and the ease with which they could work their way through the program. They also mentioned the fact that they knew immediately when a question was answered incorrectly and could go back through the questions as often as desired. Additionally, students mentioned the learning environment of the computer, which they found to be a non-threatening way to check on their understanding of the course content. College students, as students at other levels, are often reluctant to offer an answer to a question publicly if they believe they might be wrong. The computer allowed them to offer answers without the threat of public humiliation.

As the instructor, I found the record keeping function particularly helpful in following up on students. When I noticed a student's name not listed in the records of the computer, I made a point of discussing with the student the reasons he or she was falling behind. I found there was a high degree of correlation between the amount of time spent answering the questions on the computer and test scores, as well as with the quality of assignments.

Another feature that was especially helpful was the ability of the computer to randomly distribute possible answers to the multiple choice questions. This helped to eliminate the possibility of students memorizing the letter of the correct answer. The questions were also randomly presented to the students within a given topic area. This helped keep the boredom factor to a minimum when a student needed to go through a topic area several times.

However, after a few weeks of using the authoring program, a number of limitations, with this system began to become obvious. Although the program did allow the writing of a variety of types of questions, several of the possibilities had severe shortcomings. For example, fill-in-the-blank questions were limited to five possible correct answers. In order for a student to answer a question correctly he or she had had to enter one of the five possibilities exactly, including the use of upper and lower case letters. In many cases when this type of question was used, students who understood the concept received a response of incorrect from the program because of slightly different phrasing of their answers or a variation in the use of capital letters. The students found this to be very frustrating. For this reason, fill-in-the-blank questions were abandoned even though in many cases I would have preferred it from a teaching point of view.

The use of multiple choice questions also faced limitations. In this case, the possible answers were limited to thirty characters. This led to the use of phrases and abbreviations which sometimes caused confusion for the students. Once again the result was sometimes the testing of semantics as opposed to concepts of photography. .

The overriding limitations, however, were the inability of the program to display any type of graphics and the lack of any branching based upon student responses within the program. Photography is a visual subject and the concepts need to be seen as well as written. The inability to use any type of graphics greatly limited the types of information that students could test themselves on. The lack of branching within the program meant that it was severely limited in its ability to actually present information to the students. This program is designed to simply display a series of questions to the students and provide a brief statement of feedback on the correctness of the student response.

For these reasons, a search for more powerful software was undertaken to expand the use of the computer in delivering information to the class. The advantages mentioned above to the students were too valuable to discard because of a lack of sophification of the software. The problem became one of finding software that overcame most or all of the shortcomings while maintaining the strengths. The software that most fully met this criteria is a complete authoring system called Quest. This system is designed to permit the easy production of computer-assisted instruction. It allows branching from one frame to another based upon student responses. Students correctly answering a series of questions concerning one concept can be branched to a second concept, while students responding incorrectly are branched to a more detailed explanation of the information complete with visual information. This allows me, through the use of the computer, to begin to fully deal with students as individuals.

The presentation of visual information is accomplished in three ways. First, the program contains a shape editor so that computer graphics images can be easily created and entered into a sequence. Second, the program will also import graphics images created by other microcomputer software. In addition, the program will control a video disk player and therefore provide access to high quality images similar to the quality of the photographic images the students produce in the class. In addition, graphics and text can be superimposed on top of a videodisc image to point out specific characteristics of the image. Working with this feature allows the use of a wide range of videodiscs to teach concepts in photography.

Student response again has been very positive to the use of the authoring system and the interactive video. The ability to include motion and still sequences into the learning materials has proven to be helpful to the students in understanding the concepts. Audio sequences provide the students with the opportunity to listen to a second instructor and manner of presenting information.Students have often commented upon the text or graphics images superimposed upon the "photographs" presented by the videodisc. This has shown itself to be a major step in eliminating confusion concerning which aspect of the visual is being discussed or demonstrates a particular point. Other responses and reactions from the students have included the same advantages of the first authoring system, including its availability and access and the "friendly" environment provided by the computer.

The major limitation to the use of the program has been the complexity of creating the instruction. Because of the large number of variables built into the program, it is time consuming to develop an instructional unit. For this reason, I began by using the program only in a limited fashion. The first step was to translate the questions from the previous software to this more complete authoring system. This provided the opportunity for me to increase my experience with the software and become more knowledgeable about its capabilities. In this process, I was able to eliminate most of the shortcomings mentioned earlier concerning the simpler authoring program. Fill in the blank type questions can be created which will accept a wide range of correct answers. The use of capital or lower case letters in no longer an issue. Multiple choice responses are not limited to a specific length, so the need for abbreviated responses is eliminated.

Currently I am expanding the use of the branching by beginning to write instructional sequences. I have begun with remedial sections for students unfamiliar with a particular concept such as film developing, depth of field and focal length. In these applications, I find the use of videodisc images particularly useful. For example, one segment from the videodisc demonstrates the image size and angle of view of a scene photographed with a range of focal lengths of lenses. Superimposed over the image is the particular focal length used and an indication of how much of the scene will be photographed with a different focal length lens.

Within the next year, I expect to have a major portion of the beginning concepts of the photography course taught by the computer. This will allow me to spend more of the class time working directly with the students and their specific needs instead of lecturing to all as if they had exactly the same amount of background and experience with the topic.

This photography course has undergone a large number of changes over the last several years. The application of technology, whether in the form of instructional slides or microcomputer controlled videodisc has the potential to greatly improve the science of teaching. However, care must be taken to ensure that the technologies chosen are appropriate for the students and the content of a particular course. Above all else, the recent developments in technology demonstrate that there are a wide variety of ways of successfully teaching new concepts.

References

Quest. Salt Lake City, Utah: Allen Communication, 1986.

Study Guide. St. Paul, Minnesota: Minnesota Education Computing Corporation, 1984.

Computerized Television: Technology Overshadows Aesthetics

Nikos Metallinos

Scholars who have observed the influence of communication technology on contemporary society have long ago identified ours as the information society. New communication media technologies have caused an information explosion in contemporary society which has reached global dimensions (Arnopoulos, 1982; Valaskakis, 1980; Rogers, 1986). As is the case with such explosions, however, the entire environment has been shaken up, altered, or even damaged and many observers are concerned and alarmed about it (McPhail, 1986).

In the field of visual communication, in general the academic discipline which studies the processes and the effects of the visual communication media), and in television production techniques, in particular, observers have warned us that some ecological changes and environmental damage due to many new technological advances in television production techniques can be devastating (Zettl, 1982). Many viewers are fascinated by and attracted to the new visual imagery but remain unaware of and often indifferent to the visual content and the synthesis of such peculiar visual messages (Chartrand, 1986). In other words, television viewers see the changes in television production techniques as they appear on the television screen, but are unaware of the potential effects such visual displays might have on them. Furthermore, the new computerized television pictures may be able to catch viewers' attention and curiosity instantly, but constant exposure to such images can immunize viewers' perceptual and cognitive ability (Treisman, 1986, p. 114B) to such an extent that recall of these visuals is found to be minimal (Metallinos, 1985).

How are we, in the field of visual communication media, to warn viewers of the possible effects of these technological advances in television production imagery? Are there workable ways to inform viewers of these gimmicks and to prepare them to choose visual comprehension over visual confusion? Scholars in the field of visual communication, perceptual psychology, television composition, and media criticism have all provided some answers. They have all helped to establish the interdisciplinary communication field known as television aesthetics which examines such basic elements of television production as light, space, time, motion, and sound in relation to each other, and to the total television program. If viewers are aware of the aesthetic value and the communicative potential of given television images, it is thought that they will become more selective in their choices of television programs. Research studies in television aesthetics, some scholars suggest, will enlighten the viewers and allow them to exercise effective and workable value judgements underlined in such television aesthetic research studies. Viewers and critics alike, aware of these guidelines, will be able to point out the visual gimmicks of computerized television, and thus to avoid them.

Concerned about the abuse of these new technologies introduced in television hardware, Zettl (1982, p. 9) questions the intentions of these technologies via the effects they might have on contemporary television viewers. He asks:

> A whole new level of pictorial abstraction has evolved in television presentations with new production requirements and, I am sure, with new perceptual effects on the viewer. But what exactly are they? Do such animated graphics maximize communication? What is the full potential of such visuals? What are their covert effects on our perception? Are they ecologically sound or do they, or could they, add to the pollution of our electronic environment?

In this paper, a series of new developments in television production technologies will be examined via their influence on the aesthetic quality of the television program. A key question addressing the problem of media technology versus media aesthetics is, "Do new developments in television production techniques increase viewers; awareness, comprehension, and appreciation of the entire content of the end product, the television program?"

For an analytical and comprehensive examination of this question, the following three subquestions emerge to guide the study: (1) Due to the overall technological developments in telecommunication media during the last decade, which particular units of the television system have been drastically changed? (2) In what specific areas and to what degree have changes in television production hardware covertly influenced television viewers? (3) What is called for in the future concerning the composition of television images and their presentation?

Developments in Television Equipment

A sizable number of new telecommunication media have emerged during the last decade such as cable television, Direct Broadcast Satellites, video games, video texts, teletexts, two-way television, computer graphics, and holography (Fletcher, 1984) to mention only a few. As a consequence of these developments, a considerable number of technologies have been developed in television hardware which have had a profound effect on the end product. In this section, the most important such developments will be examined via their influence on the synthesis of television pictures.

Cameras

The television camera, which is the first unit in the television production system, has undergone drastic changes over the last decade. From the RCA TK-60 monochrome big TV studio camera to the portable, solid state, digitally controlled models, cameras have been greatly improved. They provide maximum picture clarity and require less lighting (e.g., the small ENG/EFP camera); they offer maximum depth of field (e.g., the big television studio cameras such as the RCA TK-4 and other similar ones). Equipped with high quality electronically operated zoom lenses and supported by new, lighter, and more flexible camera apparatuses (such as pneumatic studio pedestals, television studio cranes, etc.) the big studio cameras have enhanced the quality of television studio productions. Unstable and often unnatural camera movements of the past such as dollying, pedestalling, panning, trucking, etc., have been replaced by more stable, smoother, and more flexible camera movements which convince the viewers that they are directly observing the action. Equally, the development of smaller, portable television cameras has changed both traditional television production processes (e.g., news, sports, rock videos, documentaries, public affair events, etc.) and television production techniques (e.g., live, direct broadcasting which bypasses editing. Network competition in news gathering has triggered the development of new technology and generated ENG/EFP (Electronic News Gathering/Electronic Field Production) procedures. These procedures, in turn, have revolutionized television production techniques, challenging the human involvement, the software, of television production.

Several improvements in television production videotaping techniques were made due to the invention of the high-flying computer-guided cameras known as skycam, and the hand held cameras known as steadycam. Skycam has helped to substantially modify sportscasting techniques (Talen, 1986, pp. 50-55), and the steadycam has brought the media of film and television closer together. As television cameras have become smaller and more flexible, they are handled as film cameras, merging film with video to create the field of electronic cinematography, on of the major revolutions in television production techniques and television programming today. In Mathias' and Patterson's (1985, p. xii) view, "Electronic cinematography is a new form of production, born of the marriage of video hardware and film techniques; it offers not only the best of both worlds but entirely new creative possibilities."

Such creative possibilities have been in practice since the introduction of the first broadcast quality ENG/CCD (Charged Couple Device), the solid state technology attached to small video cameras. These cameras, according to Westport (1984, p. 28), create video pictures that capture almost everything a film camera captures.

Similar creative possibilities also emerged with the introduction of HDTV (High Definition Techniques) cameras by Sony in Japan and Philips in Europe. Using a double PAL signal, these cameras produce pictures of as high a quality as those of film cameras. According to Schubin (1981, p. 77), "HDTV can provide details as crisp as those in 35 mm film and will enable filmmakers to begin to take advantage of all the beneficial aspects of video technology." Mathias and Patterson (1985, p. xi-xii) project that "The future demands a new analysis of the visual techniques that will be required by the improved picture quality of HDTV and its application to dramatic subjects."

Lights

The second unit of a television production system, and one of the most basic is lighting. Improvements in television lighting equipment which were brought about mainly in order to meet the electronic demands of the new television cameras have occurred in several major areas.

First, the lighting instruments themselves have improved. The heavy, bulky, old incandescent lighting instruments used in film studios such as Fresnels and scoops have been replaced with smaller, more flexible, easily manageable lighting instruments. These lighting instruments use quartz (tungsten-halogen) lamps, or H.M.I. (Halogen-Metal-Iodide) lamps. This change allows for faster lighting set-ups and the use of fewer lighting instruments. Another important development occurred portable lighting instruments with multiple usage. New television lighting instruments were developed which can be used either in complex television studio productions, or in remote, or location shooting. Instruments such as the Sweep Focus or External Reflector lights, the Ring Focus Fresnel Spotlights, and the Omni-Light (Lowel-for the ENG/EFP cameras), (Zettl, 1984), are specialized instruments and their multiple use capabilities have increased the creativity of lighting engineers.

An additional development has occurred in lighting controls and intensity controls through dimmers (Zettl, 1984, p. 154). The previous manual dimmer control consoles in which each light intensity had to be controlled by hand, have been replaced by new, often computer-assisted dimmer controls. This development allows the television production crew (1) to control the intensity of the light at will, (2) to change the lighting from one set to another more quickly, (3) to change the color of a scene, (4) to create special effects such as night light, sunsets, etc., and (5) to set up the lighting for several scenes at a time, economizing production time. In planning television lighting equipment, contemporary television production centers emphasize "...the need to produce multiple productions with an improved look, with a rationalized production flow, with limited production time, and which permit alterations at any time" (Kreckel, 1985, p. 46).

Audio

The third unit of the television production system in which major improvements have occurred is audio. The entire technology of television's audio equipment such as microphones, audio recording units, audio consoles, stereophonic sound, etc., has been updated and refined, improving the quality of television sound substantially. Television production no longer uses conventional microphones used in film productions. It has created its own dynamic condenser ribbon-type microphones which operate both as mobile and as stationary microphones. They range from boom, hand, lavaliere, and wireless, to desk, stand, hanging, and hidden microphones is superb, and their production flexibility and usage has greatly increase. In sound recording units such as turntables, tape recorders, audiotape cartridges, reel-to-reel tape recorders, etc., great improvements have occurred providing excellent service and flexibility for the recording of television programs.

Audio control equipment of television systems has undergone the greatest change. The traditional manual audio consoles (such as RCA's BC-7), commonly used in television studio operations in the past have been replaced by new, multi-channel stereo, computer-assisted audio consoles. Working with slide faders (such as the Audio Design BC-5), these new consoles are capable of storing and controlling many audio inputs, and are able to synthesize and produce a variety of sounds and sound effects which were previously impossible to achieve (Zettl, 1976).

Finally, the most revolutionary change in the audio unit of the television system has occurred with the introduction of stereophonic sound for television (Kaller, 1986). This innovation has elevated audio quality to a higher level than video quality. Those who have attached an FM band to their television sets can attests to such a serious imbalance. The presently low definition of television picture is aesthetically incompatible with the high quality of stereophonic sound (Zettl, 1982). When, however, stereophonic television and HDTV are allowed in North American broadcasting, this discrepancy will be resolved.

Special Effects

The television production unit known as the switcher or special effects apparatus has also undergone revolutionary changes and improvements. The switchers of the past had the capabilities to fade in and out, dissolve, cut, superimpose, chromakey, matte, matte key, clip, debeam, wipe, feedback, spot, etc. (Zettl, 1976). Today, the development of new computer enhanced DVE (Digital Video Effects) switchers allow such additional effects as flip-flops, quad split controls, cascading, double re-entries, screen simulations, multi-images, mirror or echo effects, comprehension and expansion, horizontal and vertical flips, autokeytracking, perspectives, posteriorization, mosaics, size and position changes, zoom effects, slide effects, rotation effects, fix effects, cube rotation effects, etc. (Zettl, 1984). The consequences of these developments to the study of television aesthetics are numerous. Circumstances and scenes which are totally impossible in real life can be recorded and produced visually through the magic of the television switcher. Beyond a shadow of a doubt, the visual effects produced by the DVE attached to the computer-assisted switchers are fascinating and attractive. They draw the viewers' attention and trigger their imagination. They provide easy solutions to complex production processes making the impossible appear possible. In short, they are used as attention stimulators and entertaining devices. But should this happen so freely? Does this visual pandemonium enhance the content of the programs which make use of them? Are they always ethical in their intentions or justified in their purpose? Visual communications media observers fear that overemphasis of visual gimmicks diminishes the credibility of the medium as an art form (Zettl, 1982, p. 9), and that constant exposure to such visual barrages can have covert effects on viewer's comprehension and appreciation of the content of such televised programs (Metallinos, 1986).

Recorders and Editors

There has been steady development in television production recorders and editors during the last decade. Since 1976 when Ampex introduced the

3-D, CATV, DBS

VPR-1, the first helical scan videotape recorder and its portable model the VPR-10, video recording has been greatly improved. Recording machinery, modified and improved, has formed the basis for video editing technology. Starting with single source editing and advancing to the multiple source editing system (with computerized editing and precise electronic equipment), television editing has reached a high degree of sophistication. It is known that 85% of today's televised programs are the outcome of post-production or heavy editing. As a consequence, the production process (capturing original images in the studio or in the field) has been minimized and the sophistication of television editing machinery has been greatly elevated. An account of the post-production equipment which furnishes most television production centers is given by Paulson (1984, p. 42) as follows:

> The average post-production suite is outfitted with three or four editing videotape machines; a film to tape transfer unit; a switcher with two or more preprogrammable mix/effect buses controlling 10 to 20 input sources including single or multi-channel character generator; and a small computer-based videotape machine and switcher controller capable of executing long lists of preprogrammed mixing and edit decisions. The latest update of this basic configuration is a suite that adds computer control of multi-channel audio switcher.

This shift from studio or field-based creation, in which human beings were heavily involved, to an assemblance of synthetic images made by machines, could have consequences as yet unforeseen.

Video Screens

Although the standard 3:4 aspect ratio television screen is still the most commonly used around the world, the development of the large screen in 1973 with its 3:5 aspect ratio has helped to modify the television production approach. The first big television screen named Videobeam was "...a three color-tube projection system with a special six-by-four-foot screen-that produced a bright picture more than ten times larger than that of the biggest conventional TV set..." (Lang, 1976, p. 24). Then as HDTV was developed and the standard television screen's picture was improved, big video screens were developed in Japan. Describing one such big video screen on his visit to Japan's Tsukuba Expo '85, Costello (1985, p. 28) states:

> When the huge screen is turned on, loudspeakers announce that it's "zoom-in time." A camera picks out people or groups gathered on the grass near the 82-foot-high and 131-foot-wide Jumbotron, which is the world's largest TV and video display screen. With an aspect ratio of five to three, Jumbotron can receive HDTV pictures as well as the standard NTSC. The screen is 10,000 times the size of a 20-inch TV screen and 30 times brighter.

The big video screens, although still in limited use, will influence television production techniques. The traditional videotaping techniques developed for small screens cannot be employed successfully with large screens.

Although technological developments have occurred in every piece of hardware in the television system, and it is impossible t single them all out, 3-D video, cable television (CATV), and the Direct Satellite Broadcast System (DBS) deserve some attention.

The technology of 3-D television is not new. It has gown alongside the cinemascope concept and has always had problems. However, the creators of the system believe that 3-D will flourish again and offer exciting visual possibilities for the near future. As Green (1983, p. 29) states:

> Before its recent revitalization, 3-D was viewed as a gimmick that had the faddish future of shaky speculation. Now however, with its feet on firm ground, and with the marketing support it deserves, 3-D productions, particularly in the field of 3-D video broadcasts, can look forward to an exciting development of its perhaps yet undreamed of possibilities.

Computerized television switchers and digital video effects attachments are producing three dimensional types of pictures on the small television screen which have superb quality.

The technology of cable television is not limited to transition of video programs. As a distribution system, disseminating information through ground wire, cable television has contributed to the development of television production. It has taken time to produce new and more challenging television programs and offers the opportunity for more artistic expression in its production process than networks do.

The technology of Satellite Broadcast Communication is new and fast developing. As a geospheric distribution system, it offers great possibilities in the development of new television programming which, in turn, will require a different approach to television production techniques since there must be precision and universality in programs which will be seen globally.

The technological developments in the hardware of the television production system are directly affecting television production techniques, and consequently, the form of televised programs. Improvements in technology are producing better quality (technically) television pictures and sounds. But the question still remains: What particularly covert effects will such technological developments have on those who work with them and viewers who consume the products of television?

Is New Always Better?

Although television is the most widely used medium today and one of the most effective communication mediums the world has ever known, the influence of its programming on viewers is not always immediate or apparent. Researchers on the influence of television programming on society (Gerbner, Ross, and Melody, 1973; Wright, 1959) contend that the cultural influence of television on special groups takes years to show up. During that time, the socialization process takes place and several cultural indicators emerge which help us to identify the degree to which television has influenced specific viewers. In this section, the effects that new television production technology have had on contemporary viewers will be pointed out. The discussion will be limited to such television programs as newscasts, sportscasts, public affairs programs, music videos, interviews, and talk shows.

Changes in the content of news programs have not occurred over the last ten years. But the medium's treatment of the presentation of the news has changed. By and large, the network news has been polished; field or on the scene reports have increased; visuals have also increased; most of the visuals appear like the pages of popular news journals. The news has taken on a journalistic appearance. The various parts of the television screen are filled in with other images and visuals in addition to the anchor person. Some of these visuals are frozen (digitally), others have lettering, while yet others use live action squeezed in on each of the four corners of the television picture. In order to achieve all of these visual displays, several new television system technologies are involved, the most important of which will be pointed out in this section.

Most network newscast commonly use the small ENG/EFP cameras which are linked directly with the station and provide visual and verbal information. But the rush to be first with the news on the air usually produces field footage poorly shot, scenes which are unevenly lighted, and the sound is often overshadowed by the noises of the environment. Such poor presentation is common practice in network television newscast productions.

Common technologies widely used foremost in newscasts and sportscasts, but also in music videos and daily talk shows are special effects and particularly DVE. To enhance the content of the programming and for the purpose of attracting the viewer's attention, the technology of television special effects is used to rescue the show. The extensive use of DVE's flipping and flopping of faces (e.g., the evening network television program Entertainment Tonight), compression or expansion of landscapes, the fast changes in size and position of visuals, and a barrage of other such visual tricks are often confusing and redundant. The aesthetic value of the visuals is dubious and serious observers of the medium have questioned the use of such special effects. Zettl (1986), for example, raises the questions:

> Does such visual treatment enhance the news and make it more important? Or is it a gimmick, prompted by the manufacturers of DVE (Digital Video Effects) equipment who invented such devices oblivious of use, and who now like to sell their goods and find some satisfaction and justification in seeing their technical creations applied, however frivolously?

The extensive use of computer-generated graphics-has created a new phenomenon in the television production of daily news and interview shows called graphication of television news. Zettl defines this as "all aesthetic devices that are used to make a television image two-dimensional or graphic-like, often similar to a magazine page." This aesthetic device imitates the older, more traditional medium of print. These visual gimmicks do not enhance the viewers' comprehension of the content of the news items. Zettl challenges these kinds of practices, stating that:

> Computer-generated graphics pop on the screen to give us headlines, field reporters and their stories are squeezoomed in and out over the

> newsanchor's shoulder, and fancy lettering repeats what we have heard the newscaster tell us. Through the magic of digital video, live scenes are frozen into still images and peeled off page by page as though we were flipping through a magazine.

Schubin (1985, p. 68), a regular columnist for Videography magazine, calls such effects "cheap thrills."

The technology of video lenses has offered a great service to television production due to their flexibility and optical range. But the lenses have not always been used aesthetically. An example of over-stretching the power of the telephoto super zoom lenses is shown in many rock videos in which the lenses are used freely. The compositional value of such video recordings leaves a lot to be desired. Many rock videos often overlook and defy basic principles of aesthetic composition. Distorted faces, tilted horizons, fast motions all created by unorthodox zoom lens usage are not always justified. Even the younger viewers for whom rock videos are made are becoming less and less fascinated with extensive visual gimmicks.

The comprehension and recall of visuals placed on the Z-axis is minimal when visuals move in and out over a certain speed limit (Chartrand, 1986). Studies on the stability and constancy in visual perception indicate that the average observer of visual stimuli requires certain visual conditions and needs a certain amount of time to successfully perceive and accurately recognize the motion of visual materials (Epstein, 1977). The instability and inconsistency presented to the viewer by distortion of visuals through the use of zoom lenses or fast-moving objects along the Z-axis is commonly observed in televised rock videos today. However, are network television producers sensitive to the covert effects of these gimmicks? Studies dealing with the complexity of television messages and the degree of attention paid to them by the average viewer reveal that the more visually complex the television messages, the more mental effort is required by the viewer to comprehend it (Thornson et al., 1985, p. 427). Most visually complex television programs do not allow for the extra mental effort required.

We have the technology to create artistic television programming. But we must be aware that the emphasis should be on communicating with the medium.

Future Predictions and Suggestions

Although scholars of the television medium are reluctant to make firm statements of the effects, positive or negative, of computerized television production techniques on contemporary viewers, the research and development departments of the television industry have no difficulty at all making such future predictions (Hodes, pp. 36-60). Academicians are wondering how we are going to deal with an ever-increasing, rapidly-changing television technology when we have a hard time understanding the effects of the present developments. The television industry, however, is not so sensitive to such questions. Since the industry always leads the way in television technology it is easy for them to predict future developments and trends. A chief executive for Sony Broadcast Productions, for example, states flatly that:

> In 1984, we moved one year further into the era of not what can technology produce--but what should technology produce? To a great

> extent, that question will have to be answered by the users. Their needs should determine the direction of future technological developments. As an industry, we now have the power to shape technology is. This is a paradox of our times with which we are confronted and must provide some solutions.

In a key article titled "A Glimpse Into Future Television," Nadan (1985), provides some insightful prophecies stemming from his laboratory research. Nadan summarized the future of television technology improvements as follows:

> The next generation of television receivers, in order to gain our acceptance, will most likely have (1) a large display area with a wider aspect (width to height) ratio, (2) flexibility and interactivity, (3) approximately twice the perceived horizontal resolution and vertical resolution of NTSC (National Television System Committee) television, (4) true high-fidelity stereophonic sound (not discussed here), (5) no artifacts (visible effects on the display; for example, shimmer and color flashing) that were not present in the original scene.

It is apparent that commercial television will dictate major advances in two areas: information and entertainment, and the relationship between HDTV and two-way interactive and cable television CATV will develop video shopping. Computer-generated data and direct broadcast systems through satellite will increase news information and public affairs programs and will make direct and instantaneous global communication information possible. The development of digital memories within the television receiver will open up the possibility of watching more than one program simultaneously, and HDTV will generate longer and wider pictures on bigger screens for home use.

These major future changes, along with a plethora of smaller ones, will occur whether we want them or not. Our challenge and major task will be (1) to inform the viewers of the possible covert effects of these technologies and (2) to try to redirect the scope of these inventions by working hand in hand with the industry developers.

First, we must involve scholars of the television medium in serious research on all aspects of television production, but foremost, in composition or television aesthetics. Studies in this area are very scarce (Metallinos, 1985). For a long time, and for many reasons, scholars of communication have neglected to study the components of the television system or the processes involved in the synthesis of television messages. Sporadic attempts to undertake such research are being made, but the field remains wide open. We need to scientifically study the key factors involved in the television production process. As Zettl (1982) suggests:

> For some reason, aesthetic factors in television production and methods of presentation, or even the aesthetic potentials and requirements of the television medium, have not been considered an area of serious research. Whatever the reasons for this inactivity may have been, we simply can no longer afford keeping our back turned to the study of television aesthetics.

Wide publication of such research findings will reach the viewers.

Second, in order to prevent the development of frivolous and destructive television production hardware, we must encourage our television production scholars to actively participate in research and development departments of the television broadcasting industry. Today, very few scholars and serious researchers of television production and television aesthetics are involved in the industry. The dialogue that occasionally occurs between broadcasting industry personalities and broadcast education scholars is good, but not enough. Manageable, more systematic, and more formal ways must be found to engage these two polarized worlds in common research in television production hardware. We are all responsible for the future of television. We all depend on it. The research and development of the television industry should not run so far ahead of the research and publication of television scholars or without their mutual understanding and cooperation. We should all be responsible for the welfare of human beings exposed to television's indisputable power.

Conclusions

This paper dealt with the issue of television technology versus television aesthetics. The intentions behind the developments of such extraordinary and advanced computerized television technology were challenged.

The first part of this paper briefly examined the technological advances of the last decade in the major television production units such as cameras, lights, audio, switchers and recorders, 3-D video, cable TV, and direct satellite broadcasting.

The second part of the paper discussed the application of these technologies to such key television programming genders as newscasts, music videos, and interview or talk shows. An effort was made to point out the potential covert effects such programs might have in terms of viewers' total awareness, comprehension, and appreciation of their visual content when these technologies are over-used.

The third part of the paper provides some information based on existing literature on the future direction of the development of television production hardware. It underlines the potential consequences such developments might have on information and entertainment programs. Finally, it suggests that publication of scientific research on television production related variables and the direct involvement of academicians and the television industry might help us to better understand and control the future trends in television production developments.

It should be evident from the raised and discussed here that technological developments in the television industry are often insensitive to the covert effects the application of these technologies might have on the average viewer. The television industry, trapped by the competition for higher ratings, often employs new hardware in programming before it is properly tested. Consequently, any covert effects such programs may have on viewers are left to chance.

References

Arnopoulos, P. (1982). Political dimensions on an information society:

A general overview. GAMMA Group. Montreal, Quebec.

Chartrand, S. (1986). Direction and speed of motion on z-axis staging: Effects of the recall of information. Paper presented at the Communication Studies Colloquia 1985-86, Concordia University, Montreal, Quebec.

Costello, M. (1985). The big video picture from Japan: The future is projected at Tsukuba Expo '85. Videography, 10, 27-31.

Epstein, W. (1977). Stability and constancy in visual perception: Mechanisms and processes. New York: John Wiley & Sons.

Fletcher, J. (1984). The new electronic media: Boom or bust for the arts? Paper presented at the Faculty Seminar of the University of Georgia, Athens, Georgia.

Gerbner, G., Cross, L., & Melody, W. (Eds.). (1973). Communications technology and social policy: Understanding the new cultural revolution. New York: Random House.

Green, K. (1983). 3-D video: Another step. Video Systems, 9, 24-29.

Hodes, D. (1985). Looking ahead. Video Systems, 11, 36-60.

Kaller, J. (1985). Stereophonic versus monophonic sound in a television program and its impact on the viewer. A Thesis for the M.F.A. Degree. Temple University, Department of Radio-Television-Film, Philadelphia, PA.

Kreckel, R. (1985). Light source: Studio lighting in the new ZDF television production centre. Broadcast Technology, 11, 46-50.

Lang, B. (1976). The big screens. Videography, 1, 24-27.

Mathias, H. & Patterson, R. (1985). Electronic cinematography: Achieving photographic control over the video image. Belmont, CA: Wadsworth.

McLuhan, M. (1964). Understanding the media: The extensions of man. New York: Mcgraw-Hill.

McPhail T. (1986). Electronic colonialism: The future of international broadcasting and communications. Beverly Hills, CA: Sage.

Metallinos, N. (9185). Empirical studies on television composition. Broadcasting Research Methods (pp. 297-311). In J. R. Dominick & J. E. Fletcher (Eds.). Boston: Allyn & Bacon.

Metallinos, N. (9186). Visual space: Empirical research in television z-axis staging. Humanism in a Technological Age: Communication Arts Studies: 1965-1985. Concordia University, Montreal, Quebec.

Nadan, J. (1985). A glimpse into future television. Byte, 10, 135-150.

Paulson, K. (1984). State of the art techniques: Postproduction in 1984. International Television, 2, 40-46.

Rogers, M. (1986). Communication technology: The new media in society. New York: Free Press.

Schubin, M. (1981). Video research: Hi-de, hi-de, hi-de, no? Moving movieward. Videography, 6, 74-77.

Schubin, M. (1985). Cheap thrill. Videography, 10, 68-71.

Talen, J. (1986). How the camera changes the game. Channels, 6, 50-55.

Thornson, E., Reeves, B., & Schleuder, J. (9185). Message complexity and attention to television. Communication research, 12, 427-454.

Treisman, A. (9186). Features and objects in visual perception. Scientific American, 225, 114B-125.

Valaskakis, K. (1980). The information society program. GAMMA Group. Montreal, Quebec.

Westport, D. (1986). Film and video: The CCD concept. Video Systems, 10, 28-30.

Wright, C. (1959). Mass communication: A sociological perspective. New York: John Wiley & Sons.

Zettl, H. (1976). Television production handbook (3rd ed.). Belmont, CA: Wadsworth.

Zettl, H. (1982). Research in television aesthetics. Spectra: Newsletter of the SCA, 18, 9.

Zettl, H. (1984). Television production handbook (4th ed.). Belmont, CA: Wadsworth.

Zettl, H. (1986). The graphication of television news and the personification of the news anchor. Paper presented at the Communication Studies Colloquia 1985-86. Concordia University, Montreal, Quebec.

This paper was published by the Canadian Journal of Educational Communication, Vol. 17, No. 1, pages 37-52, and is reprinted here by permission of the author and the editor.

Wayfinding in Computerized Card Catalogs: Library of Congress vs. Gallaudet University

Sandra Wright Sutherland

Use of computers in schools and other academic settings has mushroomed over the last ten years (Becker, 1986, Greenfield, 1986). Since 1976 electronic card catalogs have been in use at Gallaudet University and the Library of Congress in Washington, D.C. The purpose of both systems is to locate library materials, but they serve different populations and have different missions. Gallaudet University is dedicated to education of the deaf. Language difficulties of that population dictate straightforward practices in communication while simultaneously appealing to intellectual ability. The Library of Congress, on the other hand, has the challenge of serving the United States government and all its people. The load on this system is tremendous. There is no reason to anticipate that systems of card catalogs within these two institutions would be the same.

Wayfinding in electronic card catalogs is related to our quest for models of the human mind (Gentner & Stevens, 1983, Johnson-Laird, 1983, Hampden-Turner, 1982). Difficulties in wayfinding have become an important focus in library research, and are areas of intensifying investigation (Matthews, 1986). It has been found, for instance, that students of the humanities have more difficulty with Boolean logic in computerized card catalogs than those in the sciences (Borgman, 1986). It is possible that future card catalogs will have various search possibilities from which one may select.

At the present time, electronic card catalogs are gradually expanding across the United States (Matthews, 1986). A new technology must work through changes before it begins adhering to standards of performance. Since the Library of Congress and Gallaudet College have two of the earliest electronic card catalog systems developed, it is reasonable to suppose that some revisions accommodating their respective populations have already been accomplished. This was confirmed by the on-duty librarian at Gallaudet University.

This investigation was conducted due to observation of considerable discrepancy in wayfinding patterns between the Gallaudet University (GU) and Library of Congress (LC) computerized card catalog systems. The GU system was used for the first time while investigating facilities at Gallaudet University. The system was found to respond to simple commands quickly. Commands were very clearly communicated on successive screens, with escape instructions on every screen. When the LC catalog was used, the assumption that it would be as accessible as the GU catalog proved false. Instead the LC catalog was difficult to enter. Escape possiblities were not shown onscreen and supporting print materials were too cumbersome to facilitate a quick search. A comparison of the two systems was conducted to find out why one system was easily accessible while the other was not.

Gallaudet University

The population served by the electronic card catalog at Gallaudet University includes deaf college students, hearing and hearing-impaired staff, and visitors. The deaf comprise a population of people who were born deaf (some of whom may also have additional handicaps) and those who lost hearing at various periods in their lives. Some of them lost hearing prelingually (prior to age two or three) before language developed and others postlingually, after the age of three (Vernon and Mindel, 1971). Those who were born deaf or who lost their hearing prelingually have difficulty with speech, language and writing due to auditory deprivation. Those who have lesser degrees of hearing loss and who lost hearing later in life have problems which are similar to those of the deaf.

Gallaudet is the only liberal arts university in the world whose mission is solely to serve the deaf. Hearing-impaired students travel from all over the world to take advantage of its unique resources. For many of these students, English is a second language. The language of the electronic card catalog at Gallaudet College must be unambiguous yet inoffensive to the intelligence and competence of these college level students. It must also be suitable for research by those who come to do special study at this institution.

Library of Congress

The Nation's library, supported by citizen funds, serves Congress and the citizens of the United States. The location of the Library of Congress in Washington, D.C. brings a multitude of visitors every year. This library serves as a model for libraries throughout the country and the world. It not only serves those who bodily use its facilities, but it serves millions at a distance through mailings and electronic media.

The total library includes three buildings, the Thomas Jefferson Building, the John Adams Building and the James Madison Memorial Building. Cataloging eighty million items accumulating at ten items per minute is an extremely complex task. The variety in the collection requires methods of cataloging not required in the average library. The collection, besides books, includes such diverse items as historical papers, maps and atlases, musical instruments, graphics of all sorts, motions pictures, microforms, sound recordings, and many one-of-a-kind items. It also administers copyright laws and serves as a resource for libraries throughout the United States.

Although the GU collection can't compare with the variety and scope of LC, LC does include, within its domain, service to deaf people in Washington, DC, and throughout the United States. It also serves many other handicapped people who deserve access to the LC collection. What this investigation found is that the LC system appears to be more complex than it actually is, possibly due to an attempt to alleviate the load on the system from its comprehensive role. This complexity may serve to discourage many people. In truth, the LC system may actually be more simple than GU's, but it looks and interacts as a very complex system. GU is a basic system which is easily negotiated and understood.

Materials

No special arrangements were made for this investigation. Computer terminals and dot matrix printers were readily available for a search by anyone seeking information in either library. The terminal at Gallaudet was one among a group of four in the main library. Two terminals were used at LC. The search was begun on a terminal located off the Main Reading Room of the Jefferson Building in an area dedicated to the computers accessing the catalog. The other terminal was located in the periodicals section of the Madison Building. The reason for moving to the second terminal is that the printer in the Madison Building produced more legible (black) copy, while the printer near the Main Reading Room produced blue copy which was quite hard to read. Photography was permitted at GU but not at LC in the Jefferson Building, and was discouraged in the Madison Building.

Procedure

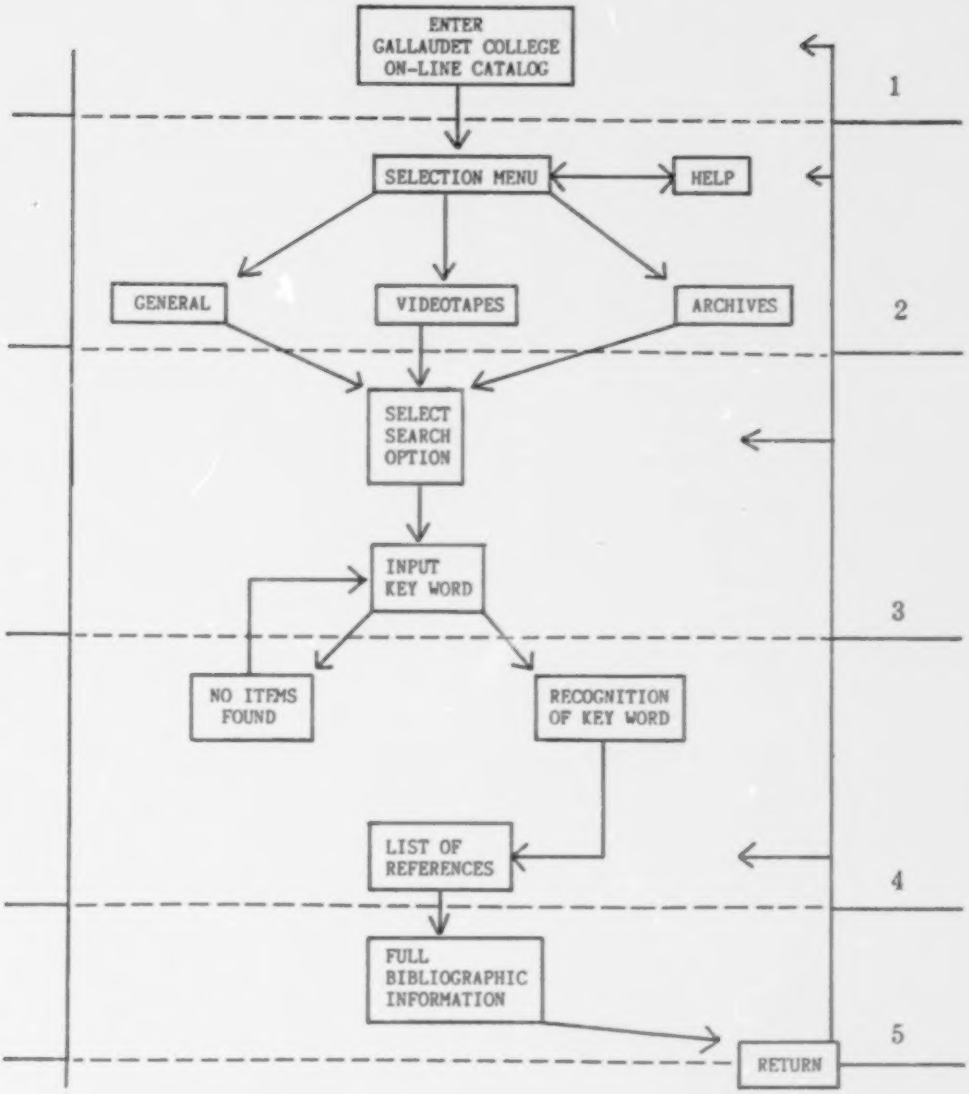
The GU system was recorded first. Photographs were taken of each screen presented to the user during a search to find material on a specific subject or author. No unusual search procedures were undertaken beyond location of materials through the Author, Title or Subject alternatives or a combination of all three. The General Collection menu was used most, but the Videotape and Archive menus were recorded in order to establish choices within these branches. Regular Kodachrome 400 ASA print film was used in a Canon AE-1 camera with a 50 mm lens to record the progression of the system.

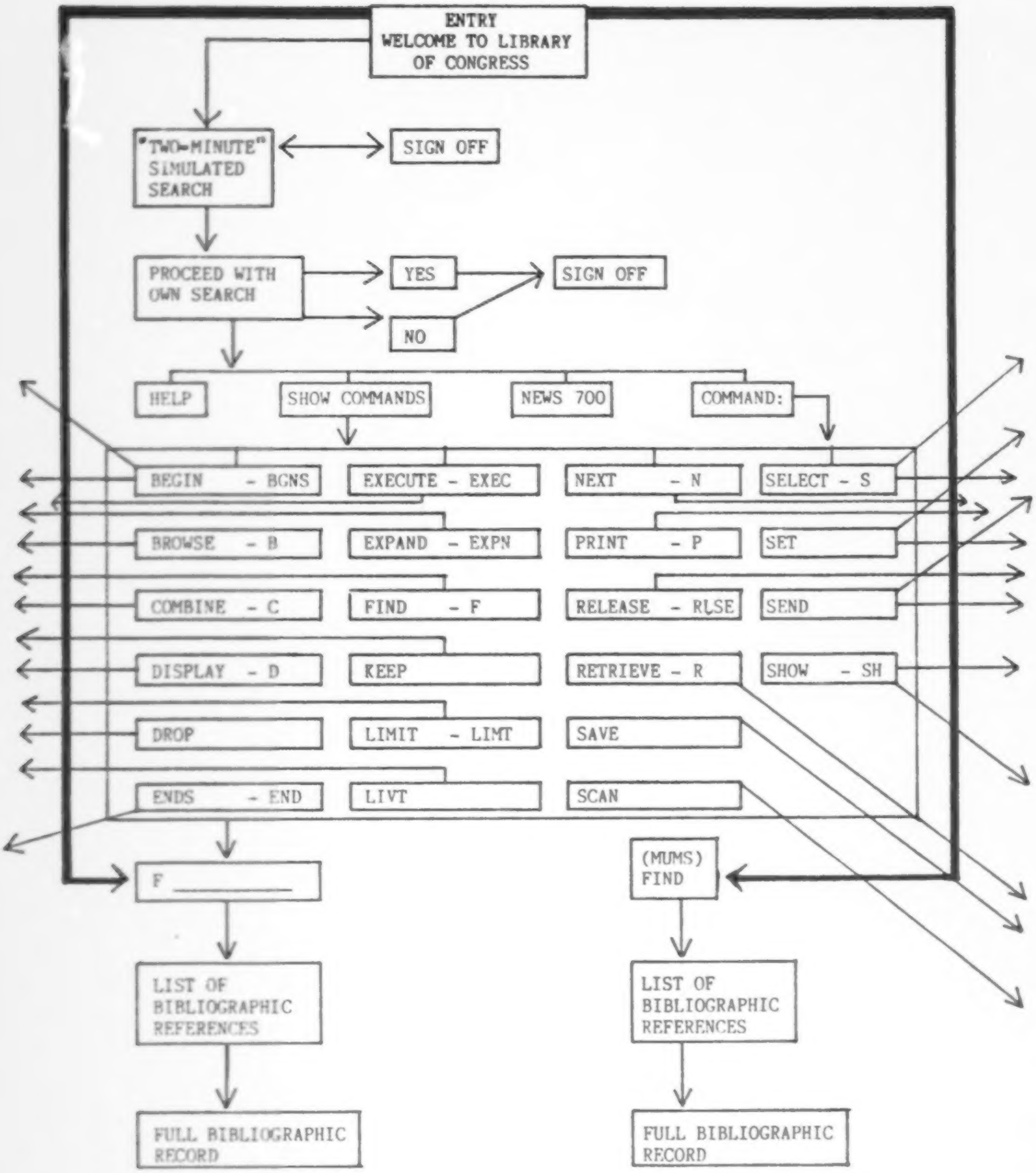
Screen displays were printed out as they appeared during the progression of the search. The "Two-Minute Simulation" did not appear to be an option, and was recorded. The real search was begun when the Two-Minute Simulation was over. It continued until the command menu was presented and the command to locate information was executed. The fact that one could bypass both the instructions and the simulation was discovered by interaction with nearby computer users in the Jefferson Building. Printing was done in the Madison Building due to better printer facilities in this building. Madison staff stated that the ribbon on the printer was new.

Flow charts were developed from the information collected. The GU flow chart shows the various levels into and out of a search for specific information. The LC diagram shows two alternatives available on the way to the same information.

RESULTS

Flow charts reflect the comparative complexity of systems as experienced during this study. The GU system has levels which can be readily accessed in either direction by the user. The speed of the system was excellent. Control was constantly in the hands of the


ENTER
GALLAUDET COLLEGE
ON-LINE CATALOG
1
SELECTION MENU
HELP
GENERAL
VIDEOTAPES
ARCHIVES
2
SELECT
SEARCH
OPTION
INPUT
KEY WORD
3
NO ITEMS
FOUND
RECOGNITION
OF KEY WORD
LIST OF
REFERENCES
4
FULL
BIBLIOGRAPHIC
INFORMATION
RETURN
5


ENTRY
WELCOME TO LIBRARY OF CONGRESS
"TWO-MINUTE" SIMULATED SEARCH
SIGN OFF
PROCEED WITH OWN SEARCH
YES
NO
SIGN OFF
HELP
SHOW COMMANDS
NEWS 700
COMMAND:
BEGIN - BGNS
EXECUTE - EXEC
NEXT - N
SELECT - S
BROWSE - B
EXPAND - EXPN
PRINT - P
SET
COMBINE - C
FIND - F
RELEASE - RLSE
SEND
DISPLAY - D
KEEP
RETRIEVE - R
SHOW - SH
DROP
LIMIT - LIMT
SAVE
ENDS - END
LIVT
SCAN
F ________
(MUMS) FIND
LIST OF BIBLIOGRAPHIC REFERENCES
LIST OF BIBLIOGRAPHIC REFERENCES
FULL BIBLIOGRAPHIC RECORD
FULL BIBLIOGRAPHIC RECORD

researcher through statements appearing on every screen which allowed selection of alternatives to the current position in the search. Since many of the options were recently experienced during transition through other levels and the same commands were repeated on each screen, the user constantly had markers for orientation to the search and the program.

The LC system, on the other hand, did not appear to present levels in the search. The "Two-Minute Simulation" involved a seemingly endless number of screens which were filled with a wide variety of information not desired by the user seeking a book. When the simulation asks if the user wishes, now, to proceed with a real search, neither a yes nor a no allows the desired search to proceed. The user is required to sign off, at which point the alternatives resulting in the real search are presented. The system asks for commands without prompting as to which commands might be available. "Show commands" brings 15 command possibilities and 7 alternatives that have no accompanying commands for use by the researcher. After just enduring the grueling Two-Minute Simulation, the last thing desired is more information from this system, especially with the loss of control accompanying any request for more information. (One develops the urge to shout "I just want to find a book!")

Experienced users of this system know that there is no real need to interact with the system at all. Input of the command "f" plus the name of the subject or author desired calls up the information accordingly. Once the user has this information, the LC system becomes quite simple.

Attempts to enter the alternate Library of Congress system named "MUMS" by input of that title brought the response "DFH2001L INVALID TRANSACTION IDENTIFICATION MUMS - PLEASE RESUBMIT" A librarian had previously said that in MUMS one had only to input "find" plus the subject, and a reference would be located. This was attempted, with successful results. Apparently the use of the whole word "find" automatically tapped into the MUMS system and it did not have to be entered formally, contrary to expectation.

Print materials were not necessary in use of the GU catalog. They were needed to identify key words in the LC catalog. Assistance from librarians was not needed for use of GU's system. The LC librarian said that system difficulties were built into the LC system to slow use by large volumes of people. Screen changes which took 7 to 52 seconds were said to have been built in to discourage large volume searches.

DISCUSSION

The Library of Congress (LC) and Gallaudet University (GU) were found to be very different systems though both were designed to help the user locate library materials. LC leads the new user into extensive teaching material which the beginner may not wish to endure. The system attempts to teach as it is used. The search simulation is filled with information and alternatives. GU uses simple presentations so that the user can readily access information. While the LC system is capable of accessing information in a direct and simple manner, the system appears extremely complex, rendering the user quite frustrated, often lost, and sometimes trapped. It actually takes more steps to negotiate the GU system, but it is so clear and and the system is so quick, that the user is very unlikely to get lost. LC, in trying to clarify its system and allow a highly sophisticated manner of investigation, allows the user to get lost and find no way out except to turn off the computer.

It would be most appropriate to offer levels for wayfinding strategies similar to those found in video games. Users could identify themselves as "Beginner", "Intermediate" and "Advanced" to call up search strategy information and pathways ranging from the simple to the complex.

The GU system does not require any use of print materials, though these materials and librarians are readily available if required. LC requires use of print materials AND help from librarians. Print materials are required to locate key words that will work in the system. While it attempts to teach itself, it does so most tediously. Any person with language, reading or learning problems would not be able to use this system without aid. Even the print materials designed to help learn the system are very poorly done and difficult to read, both from linguistic and visual perspectives. Students at GU who were in the library appeared to experience no difficulty with the system. Users at LC expressed frustration at the difficulties SCORPIO presented. Two librarians at LC expressed this same frustation.

Deaf people live with severely restricted communication avenues, and need ready access to information. In this regard, the card catalog at GU fulfills its mission admirably. It is true that the collection at GU is not and never will be as complex to categorize as that at the LC. However, there are many people who go to the LC simply to find a book. It would be very helpful if, instead of revealing all of this catalog's complexities, there was a one-page fact sheet which disclosed how a user might simply and quickly locate a book.

In this information and technological age, electronic card catalogs are increasing in accessibility. It will be very helpful to our society as a whole if we ensure access to all the citizens and learners in our country. We do not profit by separating them into 1) those who have access to simple systems, 2) those who are willing to endure considerable frustration to achieve their goal, and 3) those who are left behind due to inability to cope with systems which are unnecessarily complex.

Perhaps as electronic card catalogs become more commonplace terminals will be so readily available that overload will not be as much of a threat or problem. Overuse is not a worry for the librarians at GU. Access to the campus is restricted to those who have business there, a far smaller population than at LC. On the other hand, the LC will always be this nation's greatest informational headquarters, and the demand accompanying this role is unlikely to cease. Problems related to this role need to be addressed.

BIBLIOGRAPHY

Becker, H. (1986). Computers in schools today: some basic considerations. In Stein, N.L. (Ed.) Literacy in American Schools: Learning to Read and Write (pp. 26-29). Chicago: University of Chicago Press.

Borgman, C. (1986). The user's mental model of an information retrieval system: An experiment on a prototype online catalog. J. of Man-Machine Studies, 24 (1), 47-64.

Cassel, R.N. & Cassel, S.L., (1984). Cassel Computer Literacy Test (CMLRTC). Journal of Instructional Psychology, 11, 3-9.

Gentner, D. & Stevens, A. (Eds.) Mental Models. Hillsdale, NJ: Lawrence Erlbaum, Assoc.

Greenfield, P. (1984). Mind and Media. The Effects of Television, Video Games and Computers. Cambridge: Harvard U. Press.

Hampden-Turner, C. (1982). Maps of the Mind. NY: Collier Books.

Johnson-Laird, P.N. (1986). Mental Models: Towards a Cognitive Science of Language Inference and Consciousness. Cambridge: Harvard U. Press.

Kerr, S. (1985). Videotex and education: Current developments in screen design, data structure, and access control. Machine-Mediated Learning. 1 (3), 217-253.

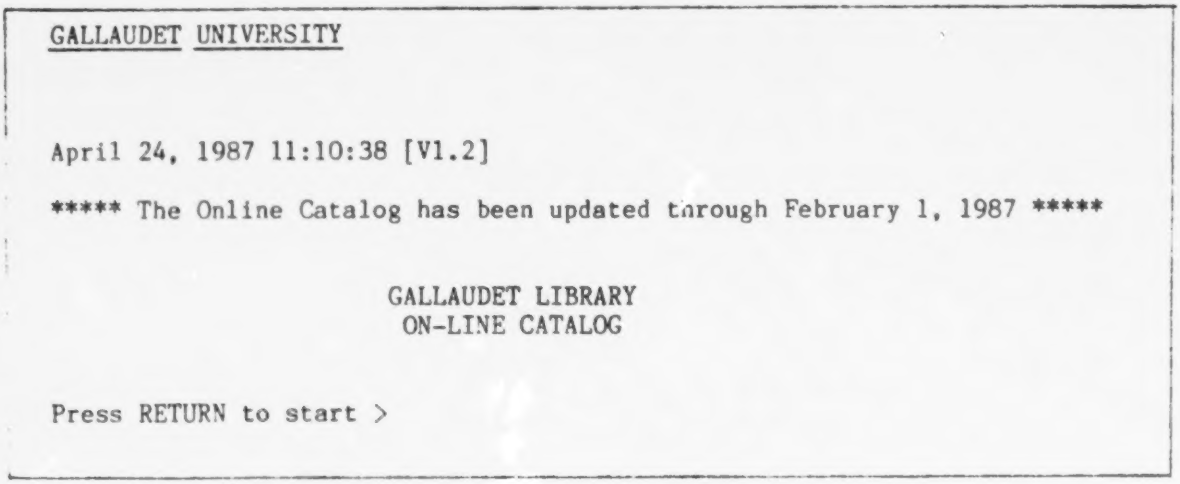
Matthews, J. (Ed.) (1986). The Impact of Online Catalogs. NY: Neal-Schuman Pub. Inc.

Suplee, C. (1986, October 5). Is this machine thinking or not? The Washington Post. p. C-3.

Torardi, M.M. (1985). The Development of a Computer Literacy Assessment Instrument. Paper presented at the Annual Convention of the Association for Educational Communications and Technology, Anaheim, CA, January 17-23, 1985. (ERIC Document Reproduction Service No. ED 256 342.

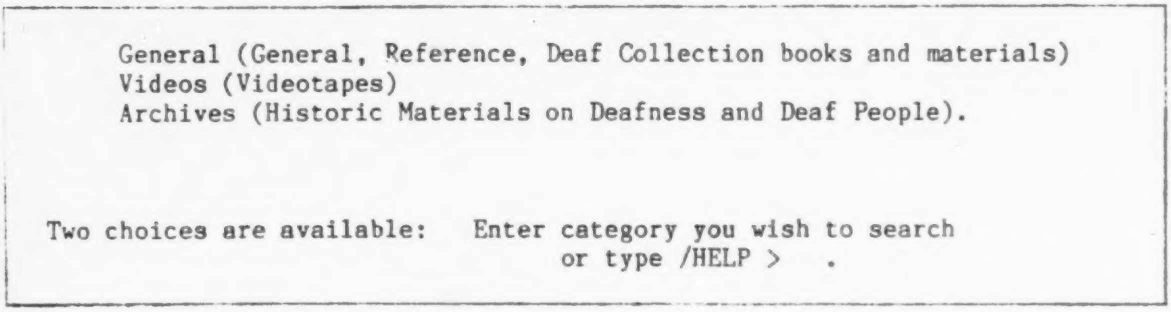
Vernon, M. & Mindel, E. (1971). Psychological and Psychiatric Aspects of Profound Hearing Loss. In Rose, D. (Ed.) Audiological Assessment. Englewood Cliffs, NJ:Prentice-Hall, Inc.

SCREENS
(as they appeared)



```
GALLAUDET UNIVERSITY


April 24, 1987 11:10:38 [V1.2]

***** The Online Catalog has been updated through February 1, 1987 *****


                    GALLAUDET LIBRARY
                     ON-LINE CATALOG


Press RETURN to start >
```

Pressing "RETURN" pulled up the selection menu screen with three search options:



```
     General (General, Reference, Deaf Collection books and materials)
     Videos (Videotapes)
     Archives (Historic Materials on Deafness and Deaf People).


Two choices are available:   Enter category you wish to search
                                   or type /HELP >   .
```

Selection of the help menu was made for explanation of the procedure and further description of each category. Sentence structure was found to be simple and somewhat redundant, consistent with techniques for expanding vocabulary and offering clear explanation to the deaf. Statements at the bottom of the help screen gave the option of "/SM", which returns the user to the selection menu, or "RETURN", which will bring back the last activity (which in this case was the selection menu). "RETURN" was selected.

It was decided to move to the "General" category, and this choice was made. This brought up a visually clear but sizeable assortment of selection possibilities. The screen looked like this:

```
  G A L L A U D E T   L I B R A R Y   O N - L I N E   C A T A L O G
                           General Collection
MAIN MENU

SEARCH options:
      /AU Author                             /AT  Author and Title
      /TI Title                              /CN  Call Numberr
      /SU Subject                            /ATS Author or Title or Subject

SEARCH SET options:
      /DI Display search sets
      /CO Combine search sets
      /DE Delete search sets

OTHER options
     /HM Help Menu                           /EN Enter a comment or suggestion
     /SM Selection Menu                      /CL Clear and start over
     /MM Return to Main Menu

Enter your choice or type /HELP >
```

"/AU" (author search) was selected. On the screen came:

```
     Enter AUTHOR search word list to search General Collection or /HELP
     or press RETURN to go back to last activity.
```

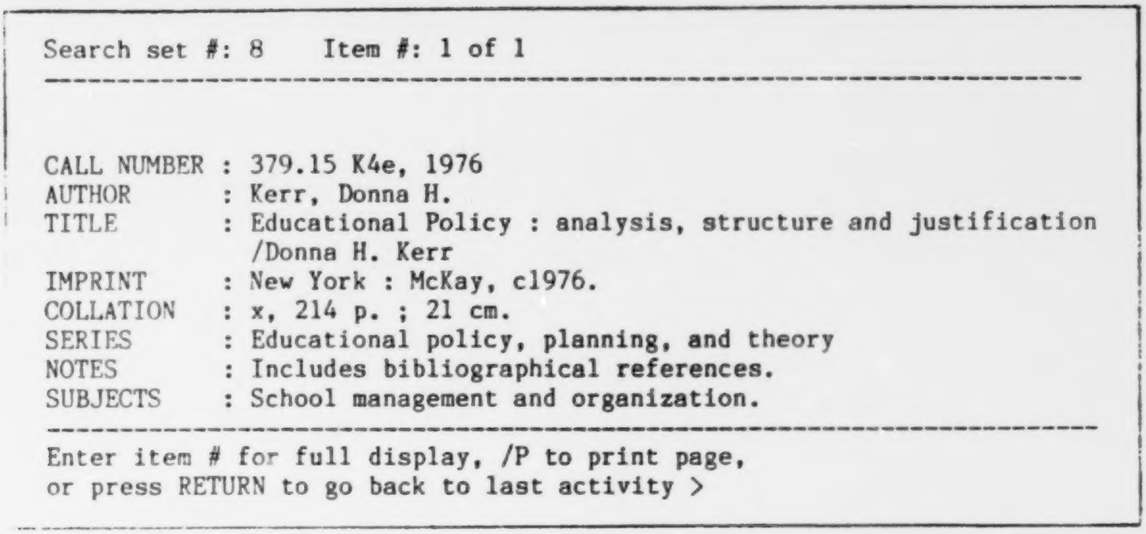
When a name was input but no references were found, the message was:

```
     No items found using your search list.
```

When a listing was found for a particular author, this screen came up:

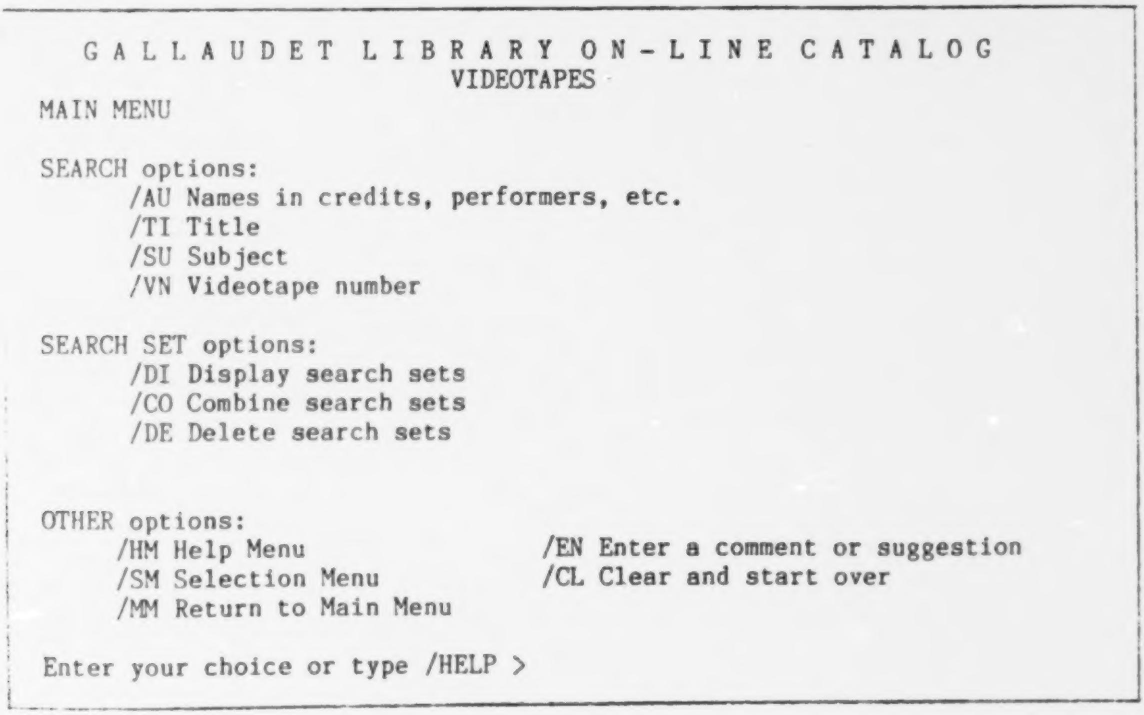
```
Search set #: 8    Items 1-1 of 1    Search: General Collection
Search request: /AU=DONNA KERR
-----------------------------------------------------------------------
ITEM #
    1> [379.15 K4e, 1976] Kerr, Donna H.
       Educational policy : analysis, structure and justification/Donna.
-----------------------------------------------------------------------
Enter item # for full display, /P to print page,
or press RETURN to go back to last activity >
```

Entering item # 1 brought up the full display:



```
Search set #: 8    Item #: 1 of 1
-----------------------------------------------------------------------


CALL NUMBER : 379.15 K4e, 1976
AUTHOR      : Kerr, Donna H.
TITLE       : Educational Policy : analysis, structure and justification
              /Donna H. Kerr
IMPRINT     : New York : McKay, c1976.
COLLATION   : x, 214 p. ; 21 cm.
SERIES      : Educational policy, planning, and theory
NOTES       : Includes bibliographical references.
SUBJECTS    : School management and organization.
------------------------------------------------------------------------
Enter item # for full display, /P to print page,
or press RETURN to go back to last activity >
```

"RETURN" brought back the previous abbreviated version of this listing. Another "RETURN" brought back the "General Collection" menu. A third "RETURN" brought back the original selection menu. This time the "Videotapes" menu was selected. The menu looked like this:



```
   G A L L A U D E T  L I B R A R Y  O N - L I N E  C A T A L O G
                              VIDEOTAPES
MAIN MENU

SEARCH options:
      /AU Names in credits, performers, etc.
      /TI Title
      /SU Subject
      /VN Videotape number

SEARCH SET options:
      /DI Display search sets
      /CO Combine search sets
      /DE Delete search sets


OTHER options:
     /HM Help Menu                /EN Enter a comment or suggestion
     /SM Selection Menu           /CL Clear and start over
     /MM Return to Main Menu

Enter your choice or type /HELP >
```

The last main menu of choice was archives, which looked like this:

```
     G A L L A U D E T   L I B R A R Y   O N - L I N E   C A T A L O G
                                  Archives
MAIN MENU

SEARCH options:
      /AU Author or Title          /AD  Associated Descriptors
      /AU Subject                  /ATS Author or Title or Subject
      /GE Genre

SEARCH SET options:
      /DI Display search sets
      /CO Combine search sets
      /DE Delete search sets

OTHER options:
      /HM Help Menu                /EN Enter a comment or suggestion
      /SM Selection Menu           /CL Clear and start over
      /MM Return to Main Menu

Enter your choice or type /HELP >
```

LIBRARY OF CONGRESS

```
Welcome to the Library of Congress Information System.

The Library of Congress Computerized Card Catalog (LCCC) lists most
books cataloged since 1968.

It can be searched by author, title or subject.

You only need three simple one-letter commands:

         b (browse the catalog's alphabetical index)
         s (select the word you want in the index)
         d (display the list of books cataloged under that word)

    The following two-minute simulated search will show you how to
proceed on your own.

    To stop the exercise at any time, just type
              sign off

    To correct an error, backspace usinng the arrow key (at bottom right
of keyboard) and retype over the error.

Please press ENTER key to continue.
```

The ENTER key was pressed and the next screen appeared:

```
In this simulation, do you want to search the catalog by:

        1. author
        2. title
        3. subject

Select one,
    type its number
          press ENTER key
```

The word SUBJECT was entered and the next screen presented:

```
Please type a number for:

       1. author
       2. title
       3. subject

and press ENTER key.
```

"3" was entered -- next screen:

```
To search the catalog by subject you should first consult the red, two-
volume published list of "Library of Congress Subject Headings" to find
the term used by our catalogers for your subject.

Suppose you want to find books about recent British spy scandals. On the
next screen is an example of the entry under "spies" in the red book.
You will see that some headings can be used, but others are excluded.

  Please press ENTER key:
```

Next screen:

```
(EXCERPT FROM PAGE 2202 OF "LIBRARY OF CONGRESS SUBJECT HEADINGS, 9TH
ED.")

Bold type indicates term
    used by computer-------- Spies  (Indent)
SA (see also) terms are          sa Agents provacateurs
    used as well                    Secret service
                                    Women spies
                                    World War, 1939-1945 — Underground
                                      movements
X terms are NOT used-------      x  Spying
XX means broader term------      xx Espionage
    that can be used                Military art and science
                                    Subversive activities
```

some terms cannot be used--- -- Fiction
(see another term) See Spy stories

NOTE: The words "indirect" or "direct" after a term mean it can be further subdivided by place.

To find books on SPIES IN BRITAIN you would thus look in the catalog for: SPIES--GREAT BRITAIN

Now, let's see how this is done in the computer. Please press the ENTER key

Next screen:

To begin, you first indicate that you want to use the Library of Congress Computerized Catalog (LCCC).

Type: bgns lccc
and press ENTER key:

Next screen:

To search for a subject you must now browse (b) the computer's alphabetical index to locate the term found in the red Subject Heading book.

From the previous excerpt you know that the proper combination of terms for books on British spy scandals would be:

spies--great britain (typed with two dashes and no spaces)

Suppose you want to browse (b) the index for these words. Type "b", a space, and your term.

Type: b spies--great britain

and press ENTER key

Task completed, next screen:

```
 BRWS TERM FILE:LCCC; ENTRY TERM: SPIES--GREAT BRITAIN--
B01 SPIES--GERMANY (EAST)--HISTORY//(INDX=1)
B02 SPIES--GERMANY (WEST)//(INDX=1)
B03 SPIES--GERMANY (WEST)--(HISTORY//(INDX=1)
B04 SPIES--GERMANY--BIOGRAPHY//(INDX=5)
```

```
B05 SPIES--GERMANY--HISTORY//(INDX=1)
B06+SPIES--GREAT BRITAIN//(INDX=14)
B07 SPIES--GREAT BRITAIN--BIOGRAPHY//(INDX=14)
B08 SPIES--HISTORY//(INDX=1)
B09 SPIES--ISRAEL//(INDX=4)
B10 SPIES--ISRAEL--BIOGRAPHY//(INDX=2)
READY FOR NEW COMMAND (FOR NEXT PAGE, XMIT ONLY):

 Your browse command (b) retrieved an alphabetical list of subjects
including the one you want.  There are 14 books cataloged under your
subject heading (INDX=14). The computer marks the entry closest to yours
with a "+" sign.

To select the books cataloged under SPIES--GREAT BRITAIN,
type "s", a space, and the line number, in this case "b6".

          Type    s b6
           and press ENTER key:
```

Next screen:

```
 SET 1          14: SLCT INDX/SPIES--GREAT BRITAIN
READY FOR NEW COMMAND:


 You have created one set of 14 books under this term.

To display the information in this set, type "d", a space, and the set
number, in this case "1" (use the number 1, not the letter L).

         Type    d 1
          and press ENTER key
```

Next screen:

```
 FILE:LCCC; TITLE/LINE --SET 1                          ITEMS 1-4 of 14
1. 73-175165:Seale, Patrick, Philby: the long road to Moscow, London,
     Hamilton, 1973, xiv, 282, 8p, facsims., ports, 23cm,
     LC CALL NUMBER: UB271.R92 P46
2. 74-908421:Guar, Dharmendra, Behind the enemy lines/, New Delhi,
     Sterling Publishers, 1975, 135 p., 2 leaves of plates, maps, 22 cm.
     LC CALL NUMBER: D810.S7 G 34
3. 76-150473:Sargent, Winthrop, The life and career of Major John
     Andre/, New York, Garrett Press, 1969, xiv, 543 p., 14 leaves of
     plates, ill., 23 cm.
     LC CALL NUMBER: E380.A5 S25 1969
4. 76-371434:Aspin, Leslie, I, Kovaks/.  London, Everest Books Ltd,
     1975, 239 p., 23 cm.
     LC CALL NUMBER: UB271.G72 A762

 The command (d) displays a list of books on the subject you selected.
(To see the next screen in an actual list, press ENTER key.)

To request a book, write author's name, book title and LC CALL NUMBER on
a multi-part call slip and give it to attendant at the central desk.
Now press ENTER key:
```

```
You have now seen the basic steps for searching the Library of Congress
Computerized Catalog, which are:

         Sign on --
                        Type    bgns lccc

         Browse the index --
                        Type   b (plus the term you want)
                        Example: b hersey, john

         Select a line in the index --
                        Type   s (plus the line number)
                        Example:  s b4

         Display items in the set created in step 3 --
                        Type     d (plus the item number)
                        Example: d 1

* If you wish, you may print this page (or any other screen display)
  by pressing the PRINT key (at top of keyboard) and the letter d.

Please press ENTER key to continue:
```

Next screen:

```
There are examples of author, title and subject searches in this
simulation. Are you interested in seeing one of these other types?



Type  yes or  no
 and press ENTER key: "no"
```

Next screen:

```
Are you ready to proceed with your own search now?

Type  yes or  no
 and press ENTER key   "yes"
```

Next screen:

```
The last item in a search is the sign off.

If you have problems, ask the reference librarian for help or consult
the instructional chart beside this terminal.

Now sign off this simulation and launch your own search with "bgns
lccc."  Good luck.

        Please type "sign off" and press ENTER key:  "sign off"
```

Next screen:

```
FRIDAY, 04/24/87   04:07 P.M.
***LCCC- THE LIBRARY OF CONGRESS COMPUTERIZED CATALOG
         is now available for your search.
         The Term Index was updated on 04/13/87.

         To learn about the contents of this file, type
         HELP and transmit.
         For a description of available commands, type
         SHOW COMMANDS and transmit.

LCCC lists books cataloged at LC beginning with language and date
indicated:
     ENGLISH 1968   GERMAN PORTUGUESE SPANISH 1975
     FRENCH  1973   OTHER EUROPEAN 1976-1977   NON-EUROPEAN 1978-1979
     New items are added every two weeks.  Some books listed are not
actually in the Library.  You may search by author, subject heading,
title, card number and partial call number.  There have been some
changes made to the DISPLAY command.  For more information, type NEWS
700
  READY FOR NEW COMMAND: "show commands"
```

Next screen:

```
Every step of a search requires a command.  With commands, you search a
file for the information you want.  This list shows the available
commands and their abbreviations.  Always put a space after a command

 BEGIN    - BGNS     EXECUTE - EXEC     NEXT     - N       SELECT - S
 BROWSE  - B         EXPAND  - EXPN     PRINT    - P       SET
 COMBINE - C         FIND    - F        RELEASE  - RLSE    SEND
 DISPLAY - D         KEEP               RETRIEVE - R       SHOW   - SH
 DROP                LIMIT   - LIMT     SAVE
 ENDS    - END       LIVT               SCAN

For more information on a command, type: SHOW COMMAND command-name
                Example:   SHOW COMMAND BROWSE

SHOW0002 Ready for new command: f interactive video
```

Next screen:

```
FILE:LCCC; TITLE/LINE--SET 7                           ITEMS 1-6 OF 8
1. 81-173408:Pergler, P/(Premysl).  The automated citizen.  Montreal,
     Institute for Research on Public Policy, 1980. xxiii, 47 p., 28 cm.
     LC CALL NUMBER: TK6643 .P45 1980
2. 82012690:Handbook of interactive video /. White Plains, N.Y,
     Knowledge Industry Publications, c1982.  viii, 168 p, ill., 24 cm.
     LC CALL NUMBER LB1028.75 .H36 1982
3. 84-7872:Iuppa, Nicholas V.  A practical guide to interactive video
design /.  White Plains, NY, Knowledge Industry Publications,
     c1984. vi, 135 p, ill., 29 cm.
     LC CALL NUMBER: LB1028.75 .I84 1984
4. 85-27555:Rogers, Everett M.  Communication Technology. New York, Free
     Press London, Collier Macmillan, c1986.  xii, 273 p, ill., 25 cm.
     LC CALL NUMBER: TK5102.5 .R55 1986
5. 85-203792:Interactive video /. Wilmslow, Cheshire, U.K, Sigma
     Technical Press, 1985, c1983.  xiv, 290 p, ill., 21 cm.
     LC CALL NUMBER: TK6643 .I53 1985
6. 86-12496:Cromwell, Peter.  Essential guide to videodisc authoring
systems /.  Westport, CT, Meckler, Pub, c1986.  p. cm.
     CIP - NOT YET IN LC
READY FOR NEW COMMAND OR NEW ITEM NBR (FOR NEXT PAGE, XMIT ONLY): "XMIT"
```

Next screen:

```
FILE: LCCC; TITLE/LINE--SET 3                              ITEMS 7-8 OF 8
7. 86-23886:Miller, Charles R/III.  Essential guide to interactive
     videodisc hardware and applications /.  Westport, CT, Meckler Pub.
     Corp, c1986. p. cm.
     CIP - NOT YET IN LC

8. 86-32425:Computer controlled interactive video.  Aldershot, Hants,
     England Seminars Ltd, c1987.  x, 108 p, ill., 30 cm.
     LC CALL NUMBER: LB1028.6 .C66 1987
LAST ITEM SHOWN.  READY FOR NEW COMMAND OR ITEM NBR:  f instructional
                                                        design
```

Young Publishers

Margaret Barrows and Pamela Workman

Young Publisher is the title that Margaret Barrows and Pamela Workman gave to the program which they began as a reading improvement tool. The program is a very simple one with a very simple goal: to improve student's reading and writing ability through book making.

Young Publishers is used in the Liberty School System at every grade level from second through eighth. It is implimented through the reading lab under the direction of Mrs. Barrows who is the reading specialist for the system. Miss Workman uses the program in her English classes at the middle school level to incourage writing skills and reinforce reading skills.

The younger students who are involved in the program make "Me" books. These books are dictated by the students to a secretary. The secretary may be the teacher, an aide, or another student. These young students tell about themselves. The secretary writes down what they say about themselves, and the student illustrates the book by drawing pictures to fit the copy.

Older students, third grade and above, work on their books independently. They can choose to write their books in cursive, print their books in manuscript, or type their books on a word processor. Although most of the books done by the older students are still illustrated with pictures to add color and detail to the story, some types of books are completed using copy only. These are books such as cook books or anthologies. However, there is no reason that these books could not have illustrations done for them as well if the students so desired.

The "Me" books, written by the younger students serve a multi-purpose. They help them to learn basic sight words, by giving them a reading source that they are comfortable and familiar with; that is themselves. When they discover that they can read the books which they have written, it builds self-confidence in the child to try more reading.

These are all very important aspects of a beginning reading program, but the most important area of reinforcement accomplished through use of the "Me" books is that they help increase the student's self-concept. Students who find reading difficult learn, through writing and then reading their "Me" books, that they are able to accomplish something of value. These books become concrete symbols to the students of what they can do. It is a book about themselves so there is no chance of failure because they know themselves. They wrote the book, it is their words, and of course, they can read it. This aspect of the program sets the students up for success from the beginning.

Going beyond the lower level books, students can begin to use book making as a means to gain knowledge in other areas related to reading and communication skills. One of types of books done by older students requires the students to conduct research to gather information about a particular topic and create a non-fiction book, using the information gathered in the research. This provides students with a background for doing research surveys that will benefit them all during their school years.

Some books, made by older students, are imaginative stories meant to be read and enjoyed. These types of stories free the students to be totally creative and are a particular favorite of students in the middle grades. A further benefit of imaginative writing is that it gives the students who have special artistic abilities a chance to showcase those talents through the illustrations they do with their writing. There is definitely no better feeling than to see a student who is considered a low achiever have an opportunity to shine in an area where he has talent that has, perhaps, gone unnoticed.

Many books, written in the upper grades, are donated to elementary classrooms. This is a strong motivator for encouraging middle school age students to write books. They can design a book using a limited vocabulary and a suitable story. This book could then be donated to a first or second grade classroom where the students should be able, because of the vocabulary used, to read the book independently.

These diverse uses of the Young Publishers program make it a very effective tool for use in the reading lab as well as in the regular classroom. During the period of time the program has been in use at Liberty Mounds, the number of students showing significant advances on their achievement test scores in reading has incresed. Many of these students have shown enough of a gain to enable them to stop attending lab classes and return to the regular, basal reading program.

Visual Aspects of Desktop Publishing: YGWYS, not WYSIWYG

Roberts A. Braden

Desktop publishing is everywhere these days. The term, Desktop Publishing, that is. To be honest, there are many people using the term that don't even have a desktop, much less one that is being used for anything that could pass for "publishing." Catchy terms and phrases are like that. The more trendy they become, the more ambiguous, and the less likely that we can find a definition that will suit everybody. With that caveat in mind, this author will provide an operational definition of Desktop Publishing that is broader than most, but still is less inclusive than it might be.

Desktop Publishing (DTP) is any production of multiple-copy printed materials accomplished using a microcomputer in the page makeup process and using some device other than a conventional printing press for duplication of the final copy.

Three critical elements were intentionally included in the DTP definition. (1.) "Printed materials" was meant to be a generic term that alludes to paper with text and/or images placed upon it -- PRINTED on it, if you will. (2.) The "microcomputer" requirement was included to set apart this new activity from all of the typewriter, pen and ink, cut-and-paste layout operations that have been going on for years in the production of newsletters, inexpensive handbills, etc. (3.) The exclusion of printing presses was an attempt to confine DTP to relatively inexpensive "do-it-yourself" publication projects.

The Visual Factor

The eager acceptance of DTP cannot be attributed to any single factor. Three factors stand out, however.

Factor 1: OUTPUT IS ATTRACTIVE

As we observe the products that are rolling out of offices, schools, and the back rooms of businesses today, we can easily conclude that with rare exceptions the visual appearance of the documents has been of primary concern to the originators. People are using DTP because the documents created look better than whatever they replace. Desktop publishers are also cranking out quite a few documents that would never have been attempted before. One reason may be that the authors previously couldn't do a good looking job themselves and were unwilling or unable to pay others to do it for them. Discounting for the moment that inexperienced and untrained desktop authors are filling the world with reams of visual pollution, the positive side of the *visual factor* is that most DTP is attractive.

Factor 2: AUTHORS CAN DO-IT-THEMSELVES

As already mentioned, a desirable feature of DTP has been that the creator of a document need not refer highly visual materials to an outside expert. Cost savings are at the crux of this factor, but it is not as simple as cheaper is better. We've all heard the old cliche, "Hey, Mom, I'd really rather do it myself!" And, lots and lots of people really would. They know what they like to see and they each believe that the best person to assemble their visual ideas is themself.

Factor 3: DTP EQUIPMENT IS [relatively] INEXPENSIVE

Besides not having to pay for the expensive services of consultants and union printers, there is another financial consideration. The outlay for a DTP workstation is half what it would have been two years ago, and it will work better to boot. The figures are misleading, but even so, the bottom line is still too much of a bargain for some people to resist.

There are many arguments that can be made in refutation of any of these factors. Some DTP output is *UGLY*. Expert consultants are worth every cent of their fees for some publishing chores. DTP is inexpensive for low volume jobs, but very *expensive* when volume goes up.

There is a myth that DTP is easy. Let us be perfectly clear about it. DTP is not easy! To be sure, it is easier to learn to be proficient at DTP than it is to learn how to be a nuclear physicist. But, like many complex skill activities, becoming adept at the design and production of desktop published materials takes time, effort, and more than a little patience. The learning curve can be abbreviated or greatly extended depending upon the DTP system one learns to use. The greater the capabilities of the DTP system, the more complicated it may be to operate. Fancy features can improve the quality of the printed product, but the more features that are tied together in a single package, the more that the operator must learn in order to fully exploit the system.

Visual characteristics are at the heart of this simplicity/complexity dilemma. Adding visual cues and visable embellishment to the printed page adds complexity to the production effort. Yet, the visually rich printed page is more easily and completely interpreted by the reader, i.e., it is simpler to understand. This same simple/complex relationship prevails in the DTP workstation. Visually oriented systems are easier to understand, and allow the operator to use the software and hardware more "intuitively." However, if a person learns to operate a system soley by interpreting the icons, pull down menus, and other on-screen cues only, it is highly likely that many of the more powerful capabilities explained in the manual will never be utilized. A simple icon can represent a complex function, but we can only extrapolate so much from what we see.

You Get What You See
or
YGWYS (ig-wiz)

Maybe that sub-title would make more sense if it were phrased, "you get what you get." Flip Wilson's famous line (as the irrepressible Geraldine) "What you see is what you get," has been re-defined, reduced to its acronym --WYSIWYG--and Geraldine's suggestive taunt, WYSIWYG (pronounced wiz-ee-wig) is now a promise that what is seen upon the microcomputer screen will be what one gets out of the printer.

Mostly WYSIWYG is a promise loosely kept but technically unfilled. The printer output may be more, or less, better, or worse than the screen image. No matter, the thought's the thing. Creative people who use DTP want to be able to adjust and modify the appearance of their work while it is still in the draft stage. They care about the visual aspect of their document, and because they care they will buy software that comes close to helping them vizualize what the final product will look like. Fortunately, as the technology improves, YGWYS comes closer to being WYSIWYG.

Pictures and Words Go Together

When we want to convey information about the appearance of any object that exists in nature, the best way to communicate that information is to show the object. In publication the best way to communicate that information is to show a picture of that object. For objects that are familiar to all readers, no pictures are necessary. Nouns will do.

For example, there is no need to show a pen or piece of paper when discussing "putting pen to paper." In contrast, the similar task of writing with a light pen upon a video tube or of sketching on a graphics tablet with an electronic stylus or of any other writing/marking task done with unconventional objects would be more easily understood if explained in words that accompany a picture.

However, we need not illustrate every uncommon noun. The average reader can extrapolate from our experience with pen and pencil, "visualizing" the appearance of alternate writing instruments. So, for further example, with a brief verbal description of a stylus and graphics tablet an author might appropriately choose to tell but not show.

Does that mean that the rule doesn't apply to unconventional writing apparatus? No. It means that it isn't an immutable rule--that flexible guidelines are needed for its application. Try these:

1. The more unusual the object, the greater the need for an illustration of it.

2. As the number of adjectives needed to describe the object increases, so does the need to illustrate it.

3. As the number of points of similarity with a commonly known object (e.g., a pen) increase, the need to illustrate an unknown or little known object (e.g., electronic stylus) decreases.

4. If the appearance of the object is an inportant characteristic -- as with an object of art or other aesthetically pleasing-to-look-at item -- the *reason* for illustrating it increases. Depending upon the context of the written material, the *need* for illustrating visually pleasant things may also be hightened, but not necessarily so.

5. If your instincts tell you that you can communicate your point better if your words are accompanied by an illustration, follow your instincts. After all, the feature of DTP that has captured the imagination of the masses is the visual power of DTP.

That last guideline obviously represents intuition rather than research. Still, it is an intuitive suggestion based upon experience..We all begin showing things to other people at a very early age. Knowing when to show and when not to do so is a developed skill. Like other skills, it is more highly developed in some individuals than in others. However, it is this author's observation that the poor communicators, the ones who have not honed their sense of when and what to show, seem to be prone to under illustrate rather than to show too much.

Visual Aspects of the DTP Workstation

For the visually oriented individual, the creative processes of DTP are becoming increasingly more fun. What you see while you create desktop documents is an example of applied visual theory. The most obvious applications appear in the screen displays of the microcomputer word processors, page description programs, graphics programs, and scanning programs. Whether the DTP activity is generated at a Macintosh or at an MS-DOS system makes little difference. Operators look through windows and rely upon sundry icons, pull-down menus, and all sorts of visual cues that are available on the monitor screen. Colors are sometimes available -- either for aesthetic reasons or as coding cues to assist with program execution. Magnified views of the most minute details of the image being created are possible in many software programs, as are whole page (or even two-page) previews of how the final product will appear.

The equipment itself is taking on a different and more sophisticated look. The personal computers are either getting smaller or they are being configured so that they stand beside the desk rather than on the desktop. The images upon the screen are becoming clearer and easier to view as resolution goes up and as better electronics reduce screen flicker. These characteristics have been available for several years for applications where price was not a major factor. Now the easier to view, better looking DTP work environment is coming within the price range of the masses.

Summary

The visual aspects of Desktop Publishing? This author likes what he sees.

Desktop Publishing: Merging Literacies

Priscilla Hardin

THE POWER OF DESKTOP PUBLISHING

Desktop publishing (DTP) is causing a stir in many circles. Defining, explaining and predicting its impact on business, education and personal computer users has become a popular pass time. Proponents of DTP extol its economy, speed and contributions to powerful communication. But, they often miss the most vital and long-ranging point. Desktop publishing permits a merging of verbal and visual literacies using highly visible, rapid-response modes. This technology has the potential to influence education and learning in ways that IVLA members can enthusiastically endorse.

How does desktop publishing differ from traditional approaches to publishing? Standard answers to the question are misleading in their simplicity. DTP is cheaper, faster and easier. It offers a working and learning environment in which the ability to arrange words and images is so easy as to eliminate the tedium of counting copy, pasting things together squarely, and rendering art work with pen, ink and copy camera. Suddenly we manipulate words as pattern and form even as we write them. We render or digitize images and place them in a wide range of sizes and styles to support our verbal messages. Exciting breakthroughs, to be sure.

But, the most potent factor in this process is the simple fact that now one person often serves as author, illustrator, editor, designer and paste-up artist. Traditional publishing procedures allocate writing and designing tasks to different people...writers write, editors edit and designers take completed manuscripts and "fix them up" for visual appeal. Now, one operator at a personal computer has technology available to perform the tasks of the entire team of professionals from traditional publishing circles.

A NEW GRAPHIC LITERACY

The power of DTP can be an awesome burden to people whose interests and training do not include the full set of competencies now available. Will ill-prepared users misuse the technology and produce mountains of ugly, confusing graphics? The second issue of *Publish*, a desktop publishing periodical, featured an article proposing that large businesses might police their DTP employees as a protection against the proliferation of graphic visual garbage. The article proposed issuing a set of page layout templates within which all employees must operate. I believe that, instead, DTP will nurture a new graphic literacy in which verbal and visual meanings blend into a smooth continuum of expression.

Both practice and theory suggest that development of graphic literacy is possible with a bit of nurture. The normal brain has powers residing in opposing sides of the cerebral cortex that serve both verbal and visual communication (B. Edwards, 1979, pp 26-43 and G. Rico, 1983, pp 63 - 82). Nature provides us with a neurological foundation for processing and producing both kinds of messages. Furthermore, nurture can play a role in the development of both verbal and visual knowing. Studies of cognitive style indicate that while individuals may have a preference for verbal or visual communications, normal learners can benefit from instruction directed at either mode of knowing.

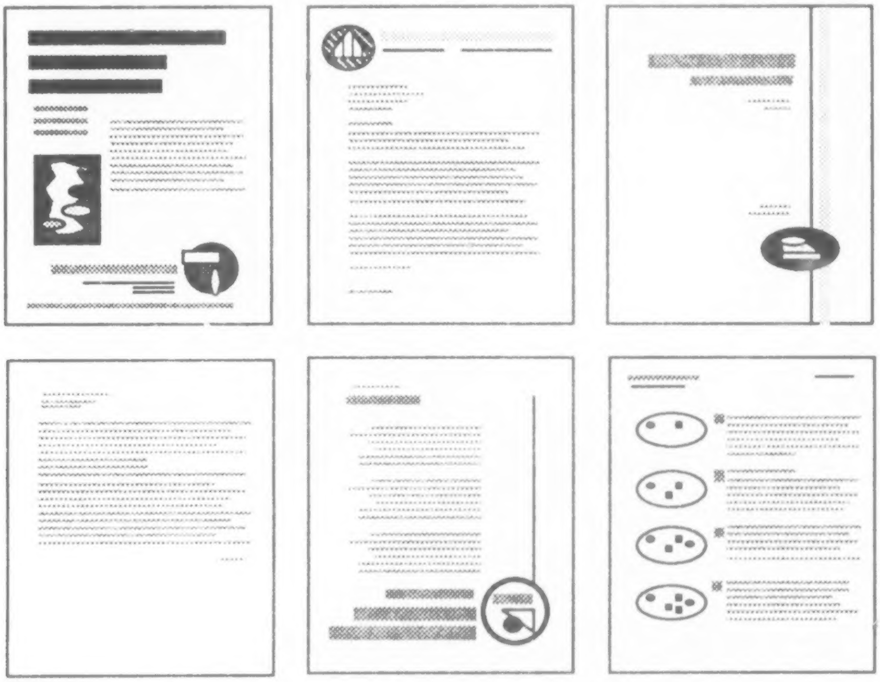
AN IMBALANCE OF NURTURE

For most of us, indeed, throughout our culture, public schooling seldom focuses on teaching communication through form, pattern and design. In actual practice, we watch for youngsters with strong aptitudes in spatial relationships and metaphoric imaging, label them "artistically talented," and send them to art classes. Along with the rest, the "untalented," *all* students go through twelve years of nurture in language arts no matter what their linguistic aptitudes. The obvious conclusion is that if technology now provides us to make communications that incorporate visual/spatial components, many people need remediation in order to exploit the new technology.

The problem may be only half as bad as it seems. Communication and languaging models regularly show a message-receiving function and a message-producing function. Our problem appears to be mainly in the area of graphic message sending since graphic message receiving skills seem to be remarkably well developed.

We can demonstrate that most viewers know how to "read" messages found in page layouts. Figure 1 offers an opportunity to explore subjective evidence that the "look" of a well designed page conveys meaning. As receivers of graphic information, we hold a lot of knowledge intuitively.

FIGURE 1



Review the above thumbnail sketches of page layouts. Identify the one that is most likely an instructional handout. Which one is the cover of a business report? ...a promotional flier? ...a memo? ...a business letter? Which one is upside-down?! Five years of repeating this informal query in workshops and classes shows a high level of agreement among viewers. The answers are so obvious as to prompt an occasional response of, "Cheap shot ...everybody knows this stuff." In terms of traditional models of communication, we are quite good at *receiving* graphic messages. If communication models are correct, it follows that graphic literates would also be skilled in *sending* graphic messages.

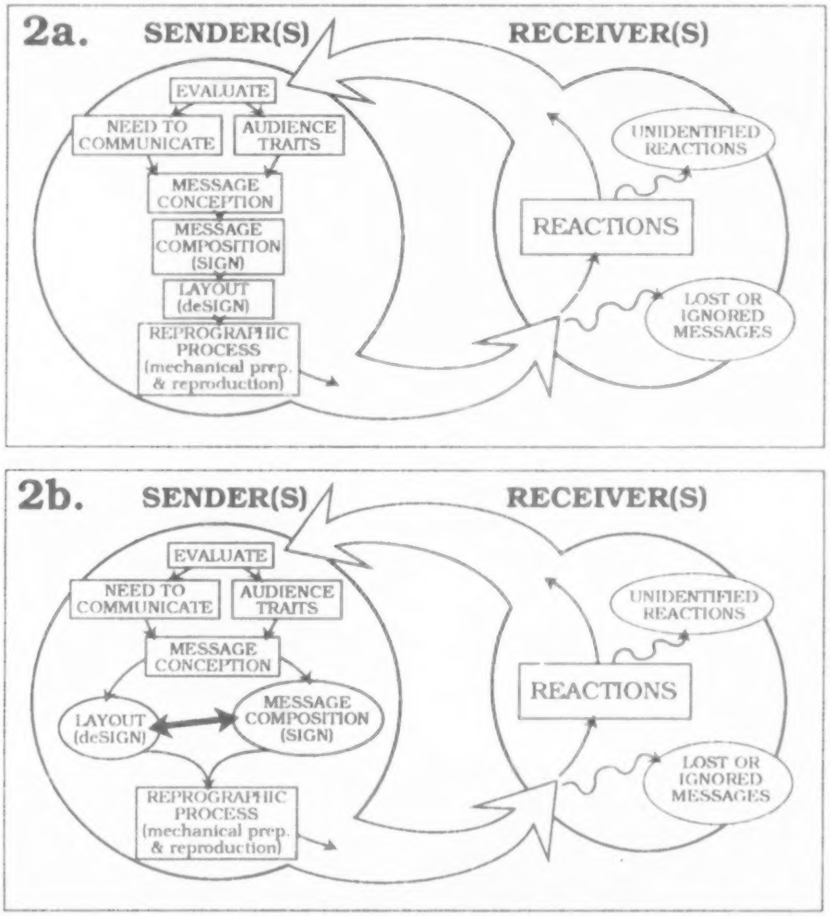
The reality becomes apparent when participants must produce their own page layouts. When the task calls for layouts other than the "letter or term paper format" learned in school they struggle hard and produce poorly. Uncertainty about how to *make a page look like it means* drives untutored page producers to ineffective responses. They slap diagonal lines of type at upper and lower corners of the page, stick little bits of clip art into empty spaces and scatter clumps of text wildly around the page in an effort to use all of the space. They "read" page layouts as consumers but as producers they reveal a woeful graphic illiteracy.

SIGN AND DESIGN GRAPHIC PRODUCTION

Figure 2 presents two models for graphic communication; each presents message sender activities on the left and message receiver functions on the right. Figure 2a. shows a traditional, linear treatment of the stages of publication development from "message conception" through "publication." There is nothing wrong with this model IF we accept the idea that the form of inFORMation makes no contribution to its meaning or that we will always rely upon specially-trained designers to provide the "Form" or design step.

In Figure 2b., the linear model of graphic design expands to show an interactive relationship between the "Form" and "Content" elements of page preparation. This form and content relationship is a metaphor for the interplay between the cerebral hemispheres. It should serve in much the same fashion to produce a balanced communication in graphic design.

FIGURE 2. Two Graphic Communication Cycles


2a.
SENDER(S)
RECEIVER(S)
EVALUATE
NEED TO COMMUNICATE
AUDIENCE TRAITS
MESSAGE CONCEPTION
MESSAGE COMPOSITION (SIGN)
LAYOUT (deSIGN)
REPROGRAPHIC PROCESS (mechanical prep. & reproduction)
UNIDENTIFIED REACTIONS
REACTIONS
LOST OR IGNORED MESSAGES
2b.
SENDER(S)
RECEIVER(S)
EVALUATE
NEED TO COMMUNICATE
AUDIENCE TRAITS
MESSAGE CONCEPTION
LAYOUT (deSIGN)
MESSAGE COMPOSITION (SIGN)
REPROGRAPHIC PROCESS (mechanical prep. & reproduction)
UNIDENTIFIED REACTIONS
REACTIONS
LOST OR IGNORED MESSAGES

BEST COPY AVAILABLE

This model implies that desktop publishing offers potential improvement over traditional publishing procedures. DTP allows the visual and content elements of a page to interact with each other right from the start. The strength of this arrangement reveals itself in numerous instances. In children's books where author and illustrator often collaborate closely we find some of the most eloquent graphic communication. In cases where author and illustrator are the same person we also see a special integrity in the product even though, in most cases, the graphic design role is still performed at the publishing house. DTP allows for the ultimate in collaboration. One person works at the computer as author, illustrator and graphic designer.

DESKTOP PUBLISHING AS SELF TUTOR

At our small desktop publishing business, my staff and I participate daily in a quiet revolution. Customers rent time on Macintosh™ computers and receive free tutoring as needed. Using mouse and keyboard, they prepare graphic originals... fliers, posters, newsletters, manuals, letterheads, résumés and display advertisements. With each visit, novice designers make small improvements in their technique. Early fliers with cluttered and incohesive elements gradually give way to more polished and sophisticated work. Self-critiquing skills improve and confidence increases. Desktop publishing technology ;has lead these people from hesitant, fearful beginnings to enthusiastic and knowing performance. These adult learners also make wise decisions about which jobs they wish to turn over to our professional staff for in-depth treatment. They have a new-found graphic literacy revealed in their work and their approach.

INTERPRETING FOR THE FUTURE

If true graphic literacy is a blend of visual/verbal or sign/design communication, we should respond to this relationship in research and educational programs.

Researchers should investigate the concepts of visual messaging in layout and design. How extensively do these types of communication influence meaning? How much precision exists in "readings" of layout devices? Are these meanings culture bound or more universally held? How do they vary within a culture in academic, professional and work-place paradigms?

If desktop publishing is a fertile field for the development of total graphic literacy, there are several implications for change in classroom and teacher preparation programs. What if we could unleash the writer in each child so that the form and shape of text, headlines and page layout become an integral part of the writing process? With a click of the mouse, young writers could emphasize words, lines or paragraphs. Skillful teaching would enable visual eloquence to overcome visual garbage just as effective language arts instruction currently develops verbal literacy.

A few months ago, I proposed this vision to a group of elementary teachers. They seemed dismayed. How could they possibly be expected to tackle such an awesome job? Even if they *had* the computers, they would not know where to begin or what to say to help students. Clearly, we are a long way from an easy transition into curricula that nurture a balanced graphic literacy.

Some direction may derive from events occurring in business. Aldus Corporation, makers of PageMaker™ software, includes a design manual with their page composition application. Trainers in desktop publishing are beginning to include design training in their instruction. The Aldus training package addresses design problems in workbooks and teacher preparation materials.

Desktop publishing technology may be a major advance in enabling communicators to achieve a balance in graphic message sending. When manual paste-up tedium gives way to easy, professional-looking page production, where else should we direct our energy but to producing more powerful messages?

REFERENCES

Edwards, B. *Drawing on the right side of the brain.* Los Angeles: J.P. Tarcher, Inc. 1979

Rico, G.L. *Writing the natural way.* Los Angeles:J. P. Tarcher, Inc. 1983

Desktop Publishing Update -- A Presentation of the Latest Equipment and Programs for Using Personal Computers to "Publish it Yourself"

Earlese M. J. Bruno

Introduction

Desktop publishing is causing a revolution for the printed word. Prior to the advent of personal computers the traditional method of publishing newsletters, according to Coffman (1986), "was a time-draining, cash-consuming proposition. Small publishers had to reply on their scissiors, paste, Gestetner machines and the will to see a dirty job through" (P. 7).

But recently we have been introduced to--no bombarded by--desktop publishing. Many articles have been written on the process as distinct from the product of desktop publishing. In the last three years a voluminous amount of literature has developed including magazines devoted solely to this topic. Can this be the new industrial revolution that Weiner (1967) predicted of in the 1950's, that would come about as a result of extensive use of automatic machines such as the computer?

Evans (1981) seemed to think so when he wrote:

> The Computer Revolution is the natural and proper successor to the Industrial Revolution, the significant difference being that we now move from the amplification and replacement of the power of muscles to the amplification and the ultimate emancipation of the power of the brain. (p. 13)

Now that computers are increasing in speed, power, memory and software availability, more and more people are turning to desktop publishing as an alternative to the traditional method of publishing. As Nora and Minc (1980) aptly put it:

> Until fairly recently, data processing was expensive, unreliable and esoteric, restricted to a limited number of businesses and operations. Data processing was elitist, a prerogative of the great and powerful. Henceforth, mass computerization will take hold, becoming as indispensable to society as electricity. (p. 3)

ADVANCED DESKTOP PUBLISHING CONCEPTS FOR THE MAC SE AND THE MAC II

Desktop publishing is the product of several recent major advances in computer and laser-printing technologies. This combination offers dramatic improvements in convenience, cost, and quality. It is a rapid, inexpensive and easy method of assembling and printing professional documents in-house. Since everyone is clamouring for greater computer power, Apple has recently introduced its latest line of Macintosh computers, namely, the Macintosh SE and the Macintosh II.

Open Architecture

The Macintosh SE is the first open Macintosh computer. It comes with one internal expansion slot, a 68000 microprocessor, and a monochrome monitor. Because the Mac SE is an upgraded version of the older Macintosh Plus, anyone having a Macintosh Mac Plus or a Mac 512K enhanced can upgrade his computer to the Macintosh SE.

When a video card is inserted in the expansion slot, it displays sharp images as a result of the high resolution. At present Super Mac is producing a video card called Scarecrow, which when installed will give the Macintosh SE a 1480 by 1024 black and white resolution.

Largest Macintosh

The Macintosh II is the largest, the fastest, and the first color Macintosh computer. It comes with: six internal expansion slots, a Motorola 68020 microprocessor, one Megabyte of RAM, and one 800K internal 3 1/2 inch floppy disk drive.

Prospective buyers can select a keyboard with 81 keys or the larger keyboard with 101 keys including additional function keys. They also have a choice of purchasing the 40 Mb or 80 Mb internal hard disk drive, and they can choose either the smaller twelve-inch monochrome monitor or the slightly larger thirteen-inch color RGB monitor.

Super Mac has recently introduced two video cards, Wizard and Toto, for the Macintosh II. The only difference between them is that Toto is used with monochrome computers whereas Wizard is used with both monochrome and color monitors. The color monitor is ideal for setting up color separations, color plates and color design work.

Impact of Color

Until the recent arrival of the Macintosh II anyone producing documents on the Macintosh computers would find his/her visuals less appealing because they lacked color graphics.

Now by simply adding Kroy-Kolor to the printed word virtually anyone's presentation can come alive with full impact. Color is obtained in a few seconds from a laser-printed copy, by simply inserting it into a sheet of Kroy-Kolor transfer film, next feeding it through the processor, and finally peeling away the transfer film. There are 60 different colors and metallic foils to choose from.

Pixel-Craft Inc., a New York based company, has produced two software packages that can add vivid colors to desktop publishing. They are : Kaleidoscope and Heaven.

Kaleidoscope is a tint generator that allows the user to combine any two colors with black for a wider selection of colors. The user can create anything from duotones to four-color process illustrations. And Kaleidoscope does not use up much memory because it creates small vector files.

Heaven, on the other hand, is a color composite video separator that allows the designer to color separate any color pixel. It uses Postscript to create the screened and separate plates for printing four colors: cyan, magenta, yellow and black. Because Heaven creates larger files it uses more memory than Kaleidoscope.

ADVANCED PAGE LAYOUT, SCANNING TECHNIQUES AND PRINTING

Pagemaker 2.0 is a page make-up software package that allows the user to combine text and graphics in any desired format before sending it to be printed on a laser printer. This upgraded software package is not copy-protected, and is currently available in seven languages.

The upgraded version has new features such as:

(a) automatic hyphenation and justification (h & j) which can hyphenate text to tighten pages, using its 110,000 word dictionary,

(b) kerning and typographic controls which allows the user to adjust spacing between letters and words,

(c) the ability to work on larger documents-- up to 128 pages can be placed into a file, allowing users to combine files to reach a maximum of 9,999 pages, and,

(d) the ability to work on facing pages interactively.

Scanning Techniques

Pagemaker supports the gray-scaled tagged image file format (TIFF), which means it has the ability to reproduce high quality images from any scanner. Thus, TIFF enables scanners to produce and Pagemaker to read high quality photographs and illustrations easily. This new feature allows users to place, resize and print complex grey-scale images. And TIFF is a standard format for all bitmapped images and gray-scale images.

Before scanning images into the computer and then printing them on a laser printer, the user must realize that there are two types of graphic art, namely, line art and continuous art. Line art is any material that will reproduce in black and white, such as cartoons and engravings. It is relatively easy to scan and manipulate because the scanner looks at each pixel and decides if it is black or white, on or off, one or zero and then it saves that information on a disk.

Continuous images, on the other hand, such as photographs and shaded drawings, are more difficult to scan. They not only consist of black and white, but they include shades of gray. Unfortunately, printers produce halftones rather than grays.

Halftones are obtained by taking a continuous tone image, such as a photograph, and scanning that image. While scanning the image, the printer will lay down a collection of dots, some big, others small. When the dots are big they overlap making the area dark, whereas small dots make the area light. However, the number of dots per square inch remains the same-- only the size of the dots varies.

Printing

One of the major advances being made today in desktop publishing saves users time when printing documents. By using a spool program, such as Super Laser Spool, the user can print files while working on other programs without disrupting the printing process.

DATA COMMUNICATION CAPIBILITIES OF MACINTOSH TO IBM COMPUTERS

Apple and other third party vendors are creating cards and other peripherals for the Macintosh computers. With one new feature, users can transfer files quickly from any IBM or IBM-clone computer to a Macintosh, an added feature which provides the user with more choices.

By just clicking the mouse, Wordstar, dBase III, and other files from the IBM PC or compatible computer can be transferred to any Macintosh by using the FT 100. The FT 100 includes a 5 1/4 inch disk drive, Macintosh software, and cable connectors. It attaches to the serial port or to the small computer system interface port.

Apple has recently developed a card for the Mac SE internal slot which when installed will allow users to transfer programs from MS-DOS to the Macintosh computer. A file-transfer program named Passport allows data files to be transferred easily.

AST, a California-based firm, is producing the Mac 86 card for the Macintosh SE computer and the Mac 286 card for the Macintosh II computer. These cards allow users to read MS-DOS files into the Macintosh computer.

CONCLUSION

This paper has attempted to demonstrate the fact that a new technology, desk top publishing, is changing the face of traditional publishing as we know it. To be able to publish letter-quality documents with relative ease and efficiency, is surely appealing and cost-effective.

Although desktop publishing seems to be the hottest craze now, many questions remain. Will it replace the traditional method of printing? What impact will this new technology have on future publishers and also on education? Will the ability of everyone to disseminate information reduce the quality of materials published, that is, will we be sacrificing quality for quantity? Only time will reveal the answers to these questions.

What we do know is that at present, the innovation of desktop publishing on the Macintosh computer has made it possible for information to be published electronically. This ability to automate the method of printing is leading to the dissemination of more information. But since the technology of Desktop publishing is new and evolving there will be many changes and much upgrading still to come that will make a good technology an even better one.

REFERENCES

Coffman, R. (1986. June). The Scoop on Newsletters. Mac User Publications, Inc., pp. 7-10.

Evans, C. (1981). The Making of the Micro: A History of the Computer. New York: Van Nostrand Reinhold.

Nora, S. & Minc, A. (1980). The Computerization of Society: A Report to the President of France. Cambridge, Massachusetts: MIT Press.

Weiner, N. (1967). The Human use of Human Beings: Cybernetics and Society. New York: Avon Books.

Video Technology & Moral Development: The Role of Electronic Media

Dennis Adams and Mary Hamm

We live in a society in which knowledge, generated by electronic technology, has changed our relationship to traditional patterns of moral development. Can we turn our new technology to civic advantage?

Scientists speculate that every fifteen years there is a doubling of significant human knowledge. And, one might add, a doubling of moral dilemmas. This incredible knowledge explosion threatens to overwhelm us unless schools can find ways to deal with an overabundance of information. Computers, interactive video, satellites, and broadcast television can help cut through the glut while broadening the curriculum.

In this new age of awesome complexity the video screen has taken its place alongside the classroom and the family as a means for defining social values. The electronic media has become the universal American curriculum--exerting a strong influence on how we all view ethical issues. Along with this unrequired influence comes a responsibility to define the issues. Reconciling what society deems most valuable and worthwhile with television and its associates is a task that requires a search for a civic consensus on the outlines of values.

The emergence of even newer technologies is changing how we come into contact with ethical issues. Small, light weight equipment can transmit stories directly from distant places. High quality algebra lessons, for example, are already being bounced off satellites to poor or remote school districts. Camcorders and briefcase size traveling satellite uplinks allow the viewer to watch live events flashed from half way around the world. And now the networks have access to satellites that go beyond transporting data (from earth-station to earth-station) to taking pictures from space. This gives us the potential of a bird's eye view of just about any point on earth--providing information about everything from forest fires in the Amazon to troop movements in Central America. The pace of information generates ethical dilemmas on a totally new scale and requires a whole new vocabulary for thinking about moral values.

In the past morality has often depended on who was promoting it. But our society does, more or less, agree on some crucial points: democratic government, equality of opportunity, individual integrity, the positive effect of education, and social responsibility. Most Americans are also serious about what this country strives to be and what its institutions represent. These values can be modeled and taught in a coherent manner that builds an understanding of the evolution of democratic values.

The development of civic ethics involves not only critical thinking but the lessening of self-deception in both the individual and society. Knowledge, thoughtful analysis, and critical thinking skills are needed to focus on the dynamic relationship between ethical, mental, emotional, physical and social well being. The idea is to bridge the world between technology on one hand and moral development on the other. Student can--and should--study the political, economic, social and ethical consequences of technological development. Making the right connections between new technology and moral issues can push our socially agreed upon visions into actual practice and accomplishments.

Everyone is involved in the education of children--whether it's directly teaching or constructing the environment where the individual has some chance for responsible moral development

Video Technology & Its Associates

TV has even started to mark children as entertainment and commercial targets--with advertizing campaigns geared toward appealing to children's values. Children need intellectual tools for cutting through this clutter. But, more importantly, much of what is viewed by children, is intended for an adult audience. This may be even more difficult to deal with. Today's video information is leaving children with a far more sophisticated knowledge of vocabulary, technical issues, and current events. Ethical concerns that were formerly left for adulthood (from atomic warfare to AIDS) are now flashing across the living room. Television has been a prime player in opening previously shut adult doors to children. Everyone must take some responsibility for the consequences.

The VCR is one of the associates of television that is changing the relationship between video information and the viewer. Usually connected to cable television, the video recorder is giving a wider range of choices--both in terms of programming and time of viewing. Getting the "Discovery Channel" is one thing, getting an "R" rated TV movie is quite another. Before they have a starting point for critically viewing the values of popular adult show business, they are caught up in its distortions. And once the video screen stimulates certain perceptions they are difficult to overcome; everything is then strained through the televised image as it enters the civic consciousness.

Good literature has always been a stimulus for moral development. TV and associated electronic technology has just as much potential. With the video screen now taking so much of everyone's time values are now less likely to be encountered in literature. This puts a heavy burden of responsibility on society's dominant media. TV and related technology may have as much *potential* as literature, but its present influence may be surprisingly more limited.

TV viewing conventions are, without much thought or discussion, providing new definitions of how our youth see their place in contemporary society. Television may not tell us what to think, but it does set the agenda for what we think about. Understanding the symbols, information, ideas, and values that emerge from what has become the dominant medium of our time is as important as critically understanding the printed word. Effective viewing of real world images requires a critical nose for both information and shades of meaning. Intellilgent consumers of video information need to be able to sort out the meaningful from the trivial.

Ideas For Helping Children and Young Adults Develop Critical Viewing Skills

There are some things we can do to help students interpret electronically produced images, examine moral values presented by television, and become critical video consumers.

1. Practice critical viewing
   Help students critically view what they watch on television. Encourage them to look at the plot and story line. What values do the main characters exhibit? What kinds of effects are created through music, set design and dialogue? What does the director do to arouse audience emotion and participation in the story? What metaphors are used?

2.Discuss programming with children

Use the parent discussion guide from the evening paper. After discussing how the values in a particular program relate to an American consensus, parents can disuss and fill in the details of their unique philosophical or religious view.

3.Analyze music videos

Metaphors are important in the thinking process and they can be expressed both visually and linguistically. Students can look for metaphor and simile and critically think about the values in the music videos they watch. After examining the use of metaphor, let students examine the values presented in their favorite visual music selections.

4.Examine advertizing messages

Advertisements are presented to students in many forms. These provide a wealth of examples for illustrating media messages. Have students examine advertising techniques. What messages are they sending their audience to make their product attractive? What claims are advertizer's making that may be distortions of reality? Encourage students to make a list of their favorite products and explain what features make them attractive. How much were they influenced by advertising?

5. Explore moral dilemmas

You don't have to reach a consensus on an issue for moral development to occur. Some educational researchers assert that the simple act of discussing a moral dilemma can lead to moral development.

Tape a selected moral dilemma presented in a TV program, or on the evening news broadcast. Encorage students to take a position on the issue. Structure the class so there are at least 30% of students on an opposing side. Have students divide into groups of six or seven (on the basis of the position they took) and come up with the best reasons to support their position. The class could then be called back together for a whole class debate.

6. Discuss and document TV programs and commercials
Have students put together a list of favorite TV programs. Encourage them to analyze the reasons for their popularity and the messages they send to their audience.

Assign students to watch TV commercials during various parts of the day and document which commercials are shown at which times. Encourage them to speculate about TV commercial messages and viewer's response.

Coping With A Glut of Moral Uncertainties

As we deal with new knowledge and learn to cope with the vast array of changes it is necessary to acquire skills that deal with that explosion of knowledge. Critical thinking and viewing skills are basic tools necessary for reading, writing and communicating in a world where there are vast quantities of moving images and information. Moral development must consider the technological possibilities, provide a variety of options, be applicable to the wider world and encompass learning how to learn.

As we redefine the curriculum for a new age we also need to think about how we will include critical thinking, language, thought, values, the arts, literature, and culture, along with the traditional curriculum.

Broadcast TV is good at introducing us to worlds that might otherwise remain hidden. Computer controlled images can allow the student to simulate the consequences of a moral decision. Both can introduce us to different worlds.

Television already has a global reach that is capable of giving us all a grasp of comparative alternatives. A heightened sensitivity to the needs of all people in American society has led to the realization that television should include programming by, and about, members of all cultural groups. TV is an appropriate vehicle to build respect across cultures and sharpen sensitivity toward other individuals.

Worthwhile knowledge cannot replace values, but must be incorporated into the values we cherish. What we pick up from the media is based on a process of filtering and choosing based on values. How we build and use it partially reflects the value structure we embrace. The greatest danger is to ignore the values that shape the individual and society. To do so is to teach in a vacuum without a vision.

Ethics is more than talking about "right" and "wrong" it is distinguishing between "good" and "evil". This doesn't mean uncritical patriotic sloganizing. The foundation of character, based on knowing the ideals and symbols of literate culture, is part of the reality of thinking and doing. Our concepts of ethics and justice can be symbolized in how we handle blinding derangements of morality in intense situations. Each individual must find distinct avenues of articulation to internalize the mysteries of ethical thinking--making them intelligible.

This generation of Americans can distinguish itself by setting a framework for national creative and moral energies. There are, after all, some values that all social groups can agree on. Civic responsibility and individual integrity cuts across all segments of American society. This doesn't mean uniformity of thought--diversity is precious to our form of democracy. It means that we can explore together the essential nature of shared national values.

If we are to help students gain skills in analytically thinking about moral dilemmas then they need a common conceptual body of information that allows for making distinctions between political ideas. Schools can teach a body of general knowledge and civic concepts--while allowing for a wide range of choice. As we evolve into a more technologically-intensive society we need to better prepare our citizens for thaking part in techno-ethical decisions. It is hard to conceptualize learning in the future without considering the role of technology.

While everyone from government, to media, to schools can participate in sketching the broad outlines of moral development--given our nation's respect for individual and group differences, others (the individual, families and religious groups) must fill in the detail. This may point to the need for more home-school-society connections. Nurturing a tender and fragile belief in moral values is a process of education and absorption that requires the marshalling of all of our energies.

References

Adams, D. "Building Moral Dilemma Activities", Learning, February, 1976.

Adams, D., Hamm, M. Electronic Learning, Charles Thomas Publishing, 1987.

Adams, D. Computers and Teacher Training. Haworth Press, 1985.

Adams, D., Fuchs, M. Educational Computing: Issues, Trends, and a Practical Guide. Charles Thomas Publisher, 1986.

Adams, D., Hamm, M. "Teaching Students Critical Viewing Skills", Curriculum Review, January, February, 1987.

Coles, R. The Moral Life of Children. Atlantic Monthly Press, 1986.

Hirsch, E. D. Cultural Literacy. Houghton Mifflin Co., 1987.

Minsky, M. The Society of the Mind, Simon and Schuster, 1986.

Schrank, J. Understanding Mass Media, National Textbook Co., 1986.

Ziegler, W. Social and Technological Developments, Syracuse University Press, 1981.

Research on Electronic Text

Andrew R. J. Yeaman

Introduction

Imagine is a powerful word, particularly when employed by designers. It not unusual to read about a totally new product so imaginative it is unrelated to anything people do or need to do. This goes against the good business sense behind successful innovations. Morita, for example, describes the electronics industry's demand for the creation of new products that people can use (1986, p. 304). The purpose of communication technology is the same as any other technology in intensifying production. It helps people do better what they are doing in the first place. Consequently, I am amazed by institutions that install electronic mail networks without either conducting a needs assessment or evaluating the efficiency of their existing interdepartmental mail and telephone systems. Similarly, I am surprised by software designers who say, "Imagine pointing to a spinning globe on a screen, flying in low over a city, selecting a hotel off the skyline, zooming in to look at the rooms and check the rates." *Imagine* is all very well in art but, imagination as a way of finding solutions first requires systematic observation of the problems. That magic carpet fantasy has little relation to how people make travel arrangements. Only a small proportion of the population needs to consult the *Airline Guide*, let alone use it online. Successful innovation depends on improving the way people do things and part of that is related to how people *think* about doing those things. From a cognitive viewpoint, preferring science and rationality over the nonrationality of intuition, I believe the model in the mind is important not only to sales but also to function and to learnability.

My scholarly interests are in human factors research on computers and learners and my current investigations focus on the aspects of human-computer interaction (HCI) that relate to reading electronic text and the future of the printed word. I am concerned with designing documents for electronic delivery in ways that allow readers to navigate efficiently and comfortably through the text. There must be a better way than the single column of text I have on the screen before me as I write! To test an alternative, I recently gave some of my graduate students the familar task of analyzing a research report. I set it up in subheaded columns, side by side. They could not only move the screen text up and down but also left and right to avoid the needlessly tedious paging through to reach subsequent sections or return to earlier ones.

The convergence of books, libraries and computers

The future of the printed word is very much involved with HCI. Books, libraries and computers are converging together as a part of an overall trend in information technology. For several years the critical research question in HCI has been, "How can we best design computers for human use?" The classic answer was to make them easier to use through interface improvements. This is not enough and a new issue of material concern has emerged, "How can computers be easier to learn how to use?" (National Research Council, 1983, chap. 5; Yeaman, 1985b). The information society causes strong economic pressures to answer this question. In addition to quantitative methods, qualitative methodology may be fruitful in providing rational answers to the instructional questions central to HCI. Therefore my purpose in writing this paper is to build on my research experiences related to the topic of electronic text (Yeaman, 1984; Yeaman 1987d). There are psychological, social, physiological, educational and aesthetic aspects requiring intellectual attention (Yeaman, 1985a). The variety of issues associated with HCI requires both rational and empirical thought (Yeaman, 1987a; Yeaman 1987b).

A brief, empirical research report

The printed word appears to have a future as an electronic display (Line, 1980) but new learning problems are posed in navigating through electronic space (Kerr, 1987). This study investigated readers' understanding of the structure of a text display following Line's redesign of a research report for electronic transmission (1981). The purpose was to examine the mental model that readers derive from the system image (Norman, 1984) towards developing device models for instruction (Kieras & Bovair, 1984).

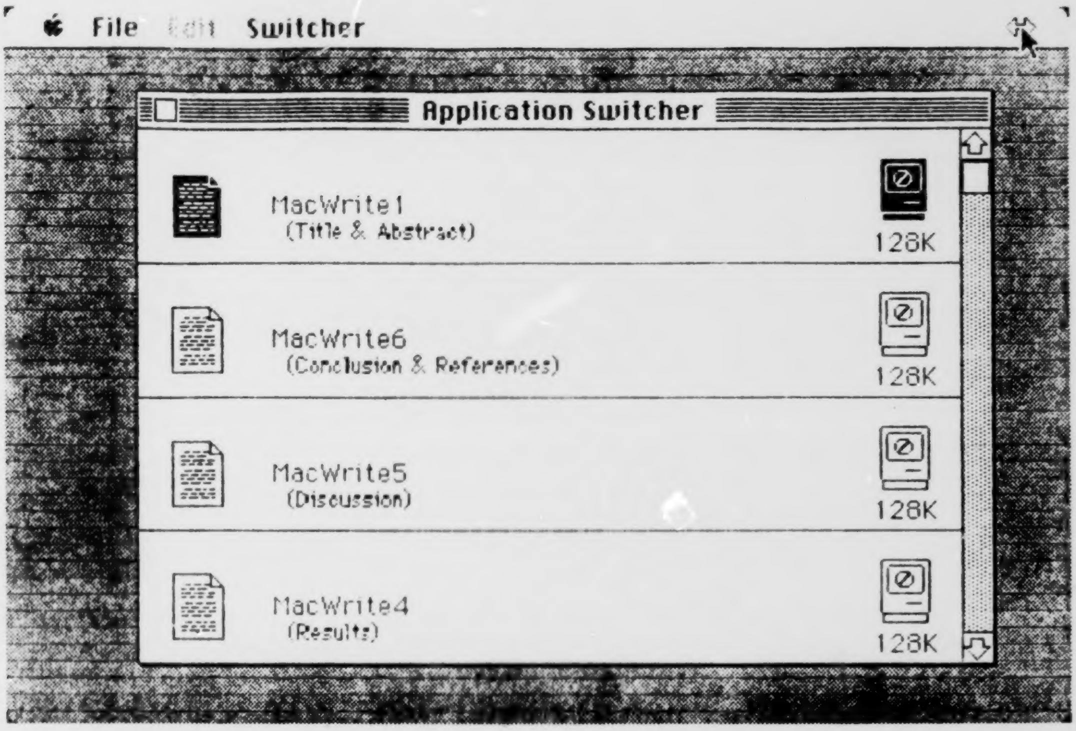
The six readers had been trained in analyzing research reports. The reading material was a longer, more detailed version of a quantitative study (Yeaman, in press). The apparatus was a Macintosh Plus running *Switcher* and *MacWrite*. See Figures 1and 2. The readers were given how-to-use-it instructions but no explanation of how-it-works. Data were collected by a test to estimate reading speed, videotaping of reading from the screen to answer 10 questions, and written descriptions and sketched diagrams by readers of how they thought the text system functioned.

In contrast to previous research on reading full screens of text, this study involved reading electronic text in columns arranged side by side. The columns were headed: Title & Abstract, Introduction & Background, Hypotheses & Method, Results, Discussion, Conclusion & References. See Figures 3, 4, 5, 6, 7, 8 and 9. No illustrations were presented but the Results section contained tables and the Introduction & Background section contained equations. The readers had been trained in pointing and clicking with a mouse. They used the scroll bar to page up or down in a column. Not only could readers page vertically through the material but they could also page to the right to look at a new section or page to the left to return to an earlier section. They accomplished this by clicking on the *Switcher* arrow. Animation showed pages turning by sliding off the left or right side of the screen.

A rational comment

I hope the tension between empirical and rational modes of thought became apparent from the parsimonious tone of my language in the last section. Although my research activity encompassed systematic observation, and qualifies as empirical, my intention was to see what happened and to make sense of my students' experiences. Rather than go on a statistical fishing expedition I chose to seek a rational interpretation. My goals were to investigate what sort of mental model people developed in response to reading text displayed in the manner described here. I wanted to know not only how well this system worked but more about how people might be better instructed in its operation.

The qualitative information gathered was immediately useful and contrasts the quantitative data Card, Moran and Newell gathered from their videos (1983). While the reading task was performed fairly well and the readers liked the system, they were not confident, despite their familiarity with the task. That semester they had each read 10 research reports and analyzed them with the 10 question form prior to the investigation of reading electronically displayed text. Reading speed estimates ranged from 140 to 420 wpm. Completion time for the reading task ranged from 27 to 53 min. Generally, faster readers read for longer periods and wrote slightly better answers to the questions:


File
Edit
Switcher
Application Switcher

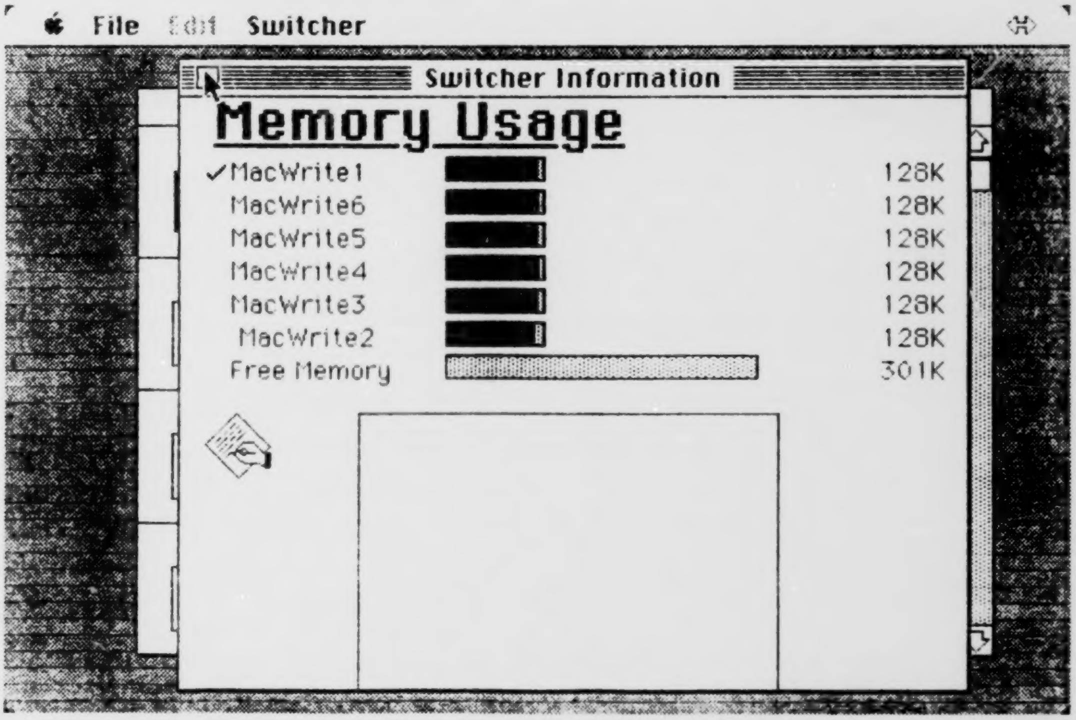
MacWrite1 (Title & Abstract) 128K

MacWrite6 (Conclusion & References) 128K

MacWrite5 (Discussion) 128K

MacWrite4 (Results) 128K

Figure 1. *Switcher allowed the Macintosh memory to be shared so that more than one word processor could run simultaneously.*

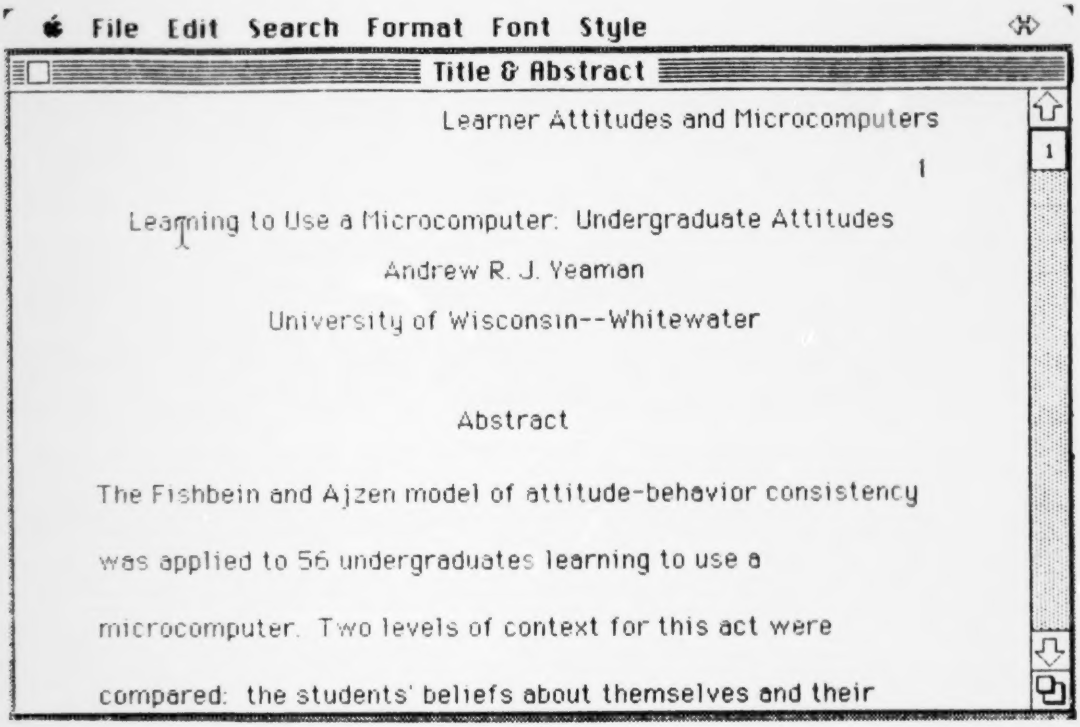

File
Edit
Switcher
Switcher Information

Memory Usage

✓MacWrite1	128K
MacWrite6	128K
MacWrite5	128K
MacWrite4	128K
MacWrite3	128K
MacWrite2	128K
Free Memory	301K

Figure 2. *Compartmentalization of memory meant that more than one text file could be openat the same time.*

BEST COPY AVAILABLE



Learner Attitudes and Microcomputers

1

Learning to Use a Microcomputer: Undergraduate Attitudes

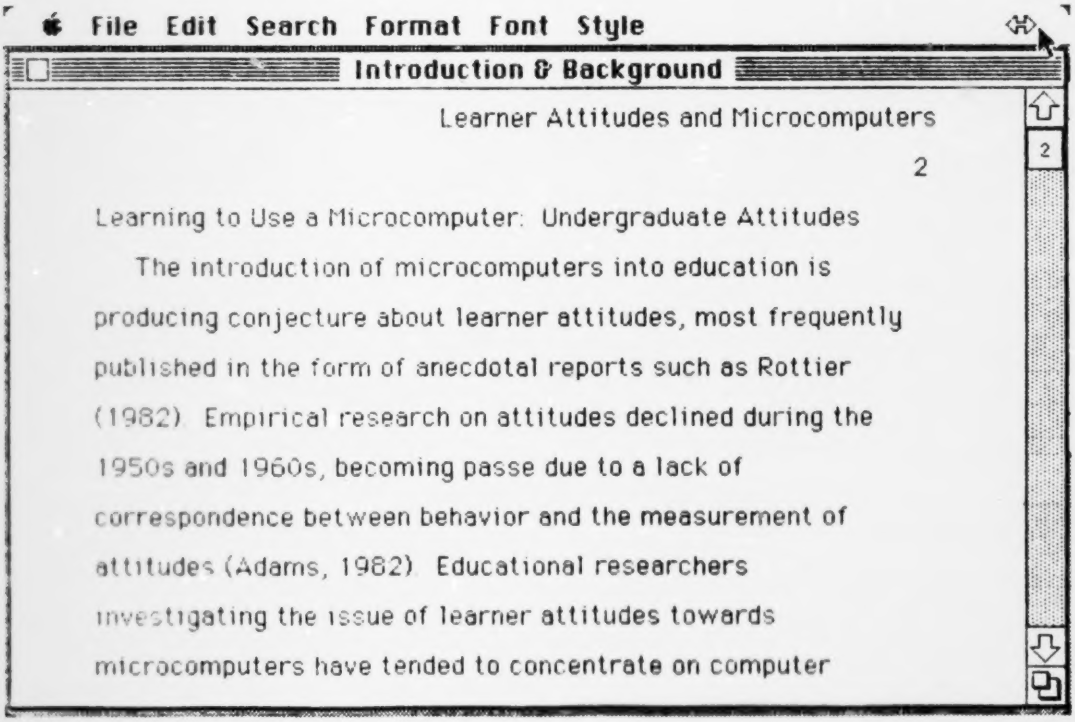
Andrew R. J. Yeaman

University of Wisconsin--Whitewater

Abstract

The Fishbein and Ajzen model of attitude-behavior consistency was applied to 56 undergraduates learning to use a microcomputer. Two levels of context for this act were compared: the students' beliefs about themselves and their

Figure 3. *Readers started at this screen.*



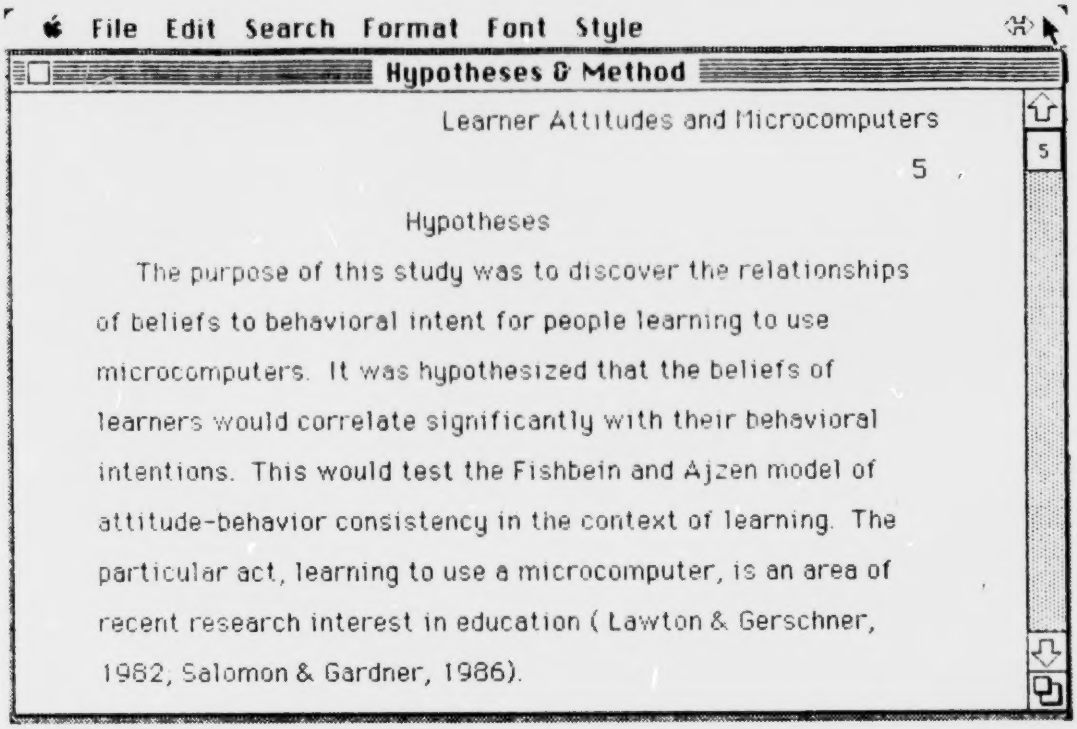
Learner Attitudes and Microcomputers

2

Learning to Use a Microcomputer: Undergraduate Attitudes

The introduction of microcomputers into education is producing conjecture about learner attitudes, most frequently published in the form of anecdotal reports such as Rottier (1982). Empirical research on attitudes declined during the 1950s and 1960s, becoming passe due to a lack of correspondence between behavior and the measurement of attitudes (Adams, 1982). Educational researchers investigating the issue of learner attitudes towards microcomputers have tended to concentrate on computer

Figure 4. *Readers clicked on the right of the double-ended arrow to page to the next section.*



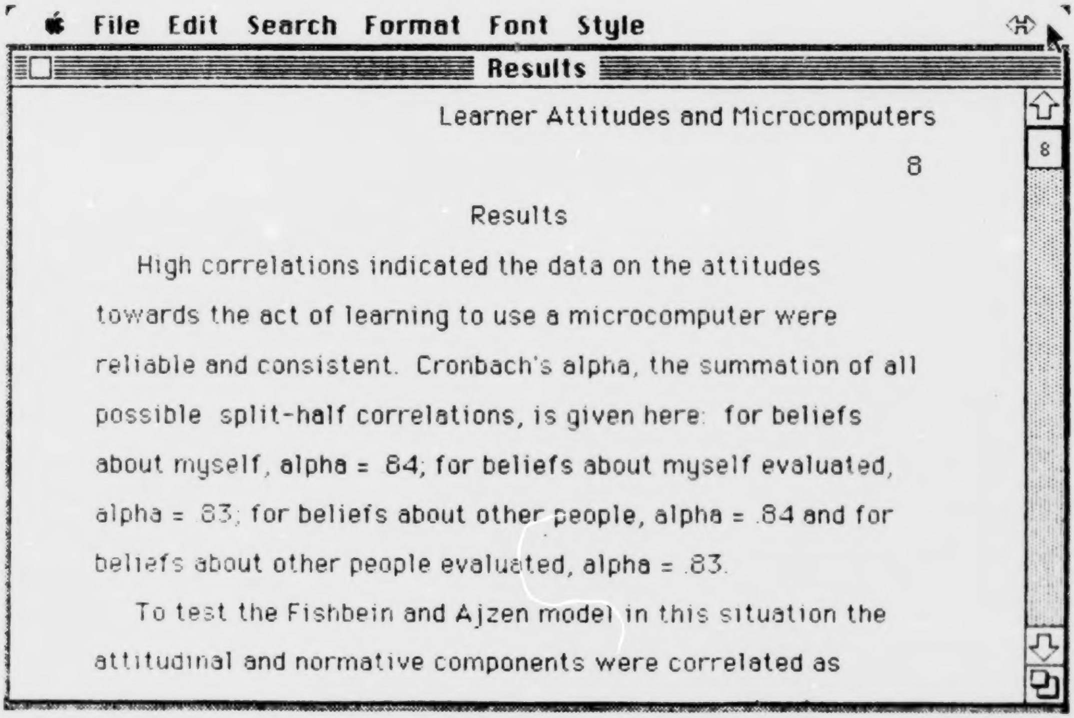
Learner Attitudes and Microcomputers

5

Hypotheses

The purpose of this study was to discover the relationships of beliefs to behavioral intent for people learning to use microcomputers. It was hypothesized that the beliefs of learners would correlate significantly with their behavioral intentions. This would test the Fishbein and Ajzen model of attitude-behavior consistency in the context of learning. The particular act, learning to use a microcomputer, is an area of recent research interest in education (Lawton & Gerschner, 1982; Salomon & Gardner, 1986).

Figure 5. *Page numbers appeared in both the page header and the scroll bar.*



Learner Attitudes and Microcomputers

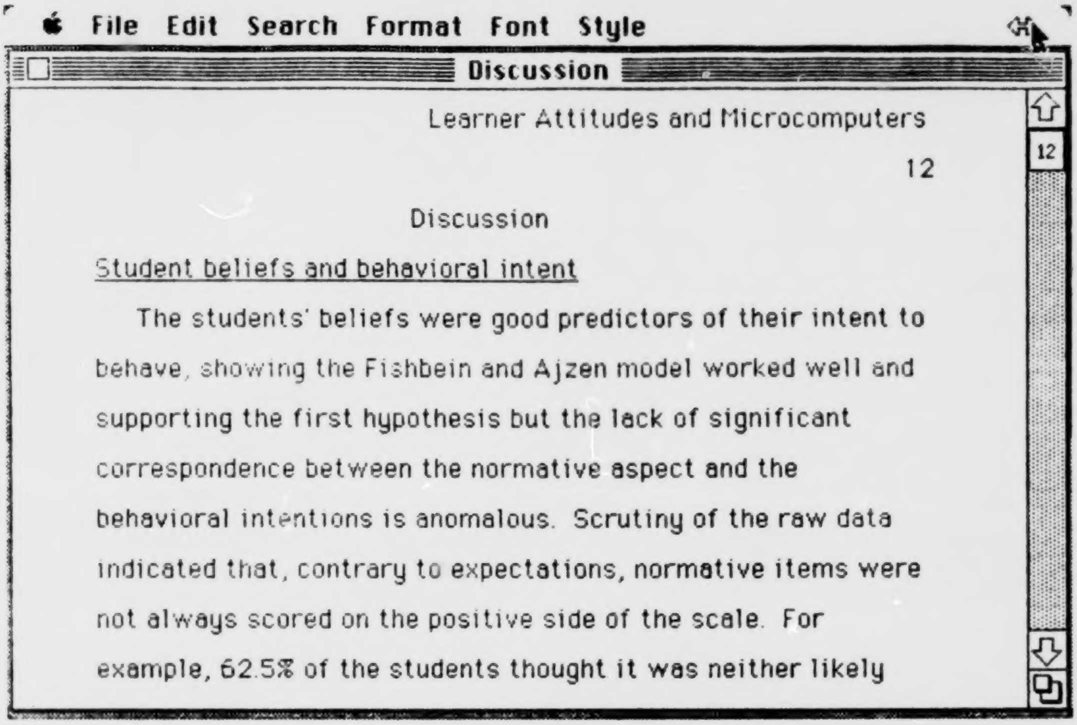
8

Results

High correlations indicated the data on the attitudes towards the act of learning to use a microcomputer were reliable and consistent. Cronbach's alpha, the summation of all possible split-half correlations, is given here: for beliefs about myself, alpha = .84; for beliefs about myself evaluated, alpha = .83; for beliefs about other people, alpha = .84 and for beliefs about other people evaluated, alpha = .83.

To test the Fishbein and Ajzen model in this situation the attitudinal and normative components were correlated as

Figure 6. *The name of the section appeared in the text of the new section and in the title bar at the top of the screen.*



Learner Attitudes and Microcomputers

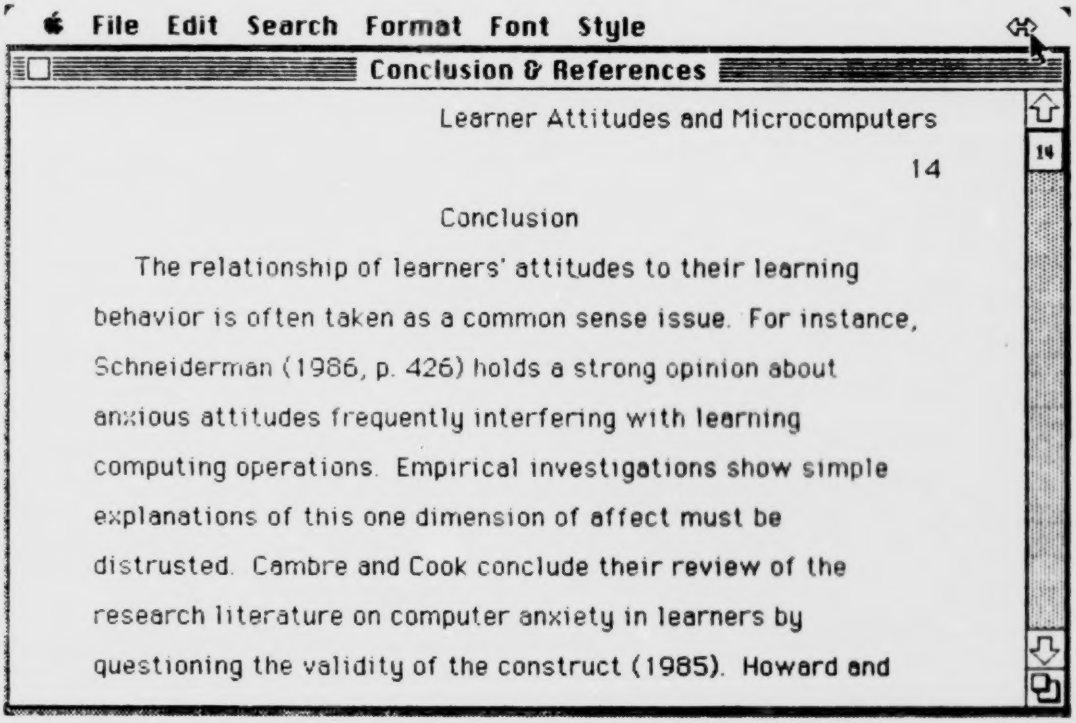
12

Discussion

Student beliefs and behavioral intent

The students' beliefs were good predictors of their intent to behave, showing the Fishbein and Ajzen model worked well and supporting the first hypothesis but the lack of significant correspondence between the normative aspect and the behavioral intentions is anomalous. Scrutiny of the raw data indicated that, contrary to expectations, normative items were not always scored on the positive side of the scale. For example, 62.5% of the students thought it was neither likely

Figure 7. *Geneva 12 point ensured the text was both visible and legible.*



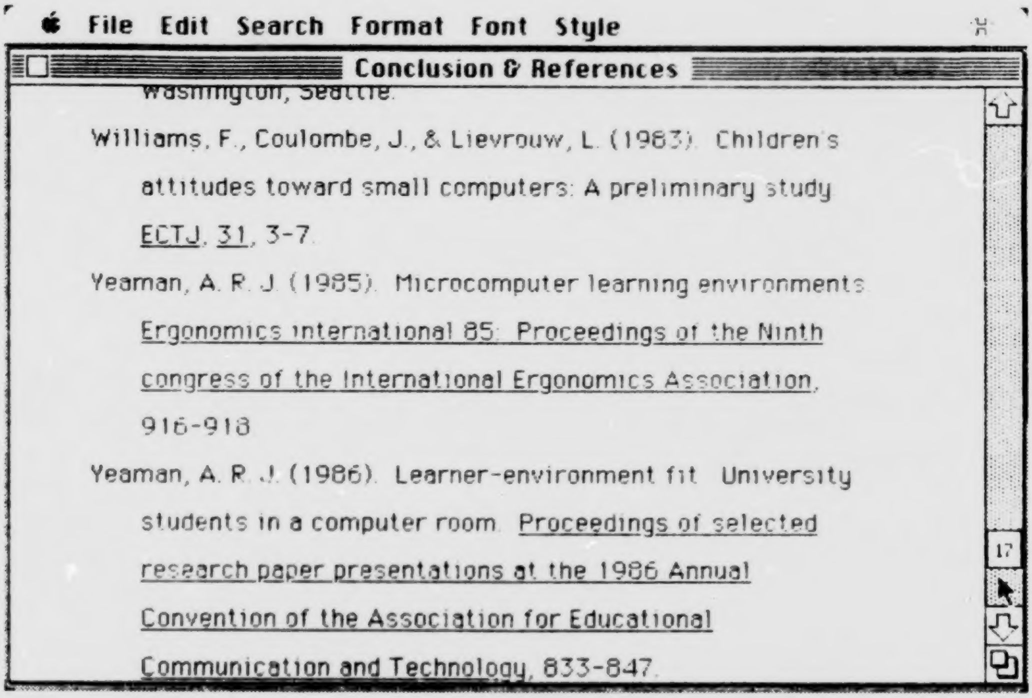
Learner Attitudes and Microcomputers

14

Conclusion

The relationship of learners' attitudes to their learning behavior is often taken as a common sense issue. For instance, Schneiderman (1986, p. 426) holds a strong opinion about anxious attitudes frequently interfering with learning computing operations. Empirical investigations show simple explanations of this one dimension of affect must be distrusted. Cambre and Cook conclude their review of the research literature on computer anxiety in learners by questioning the validity of the construct (1985). Howard and

Figure 8. *Continuing past the Conclusion took readers in a circle back to the Title & Abstract.*


File
Edit
Search
Format
Font
Style
Conclusion & References
17

Washington, Seattle.

Williams, F., Coulombe, J., & Lievrouw, L. (1983). Children's attitudes toward small computers: A preliminary study. ECTJ, 31, 3-7.

Yeaman, A. R. J. (1985). Microcomputer learning environments. Ergonomics international 85: Proceedings of the Ninth congress of the International Ergonomics Association, 916-918.

Yeaman, A. R. J. (1986). Learner-environment fit: University students in a computer room. Proceedings of selected research paper presentations at the 1986 Annual Convention of the Association for Educational Communication and Technology, 833-847.

Figure 9. *The last page of the reseach report was reached by paging down in the scroll bar.*

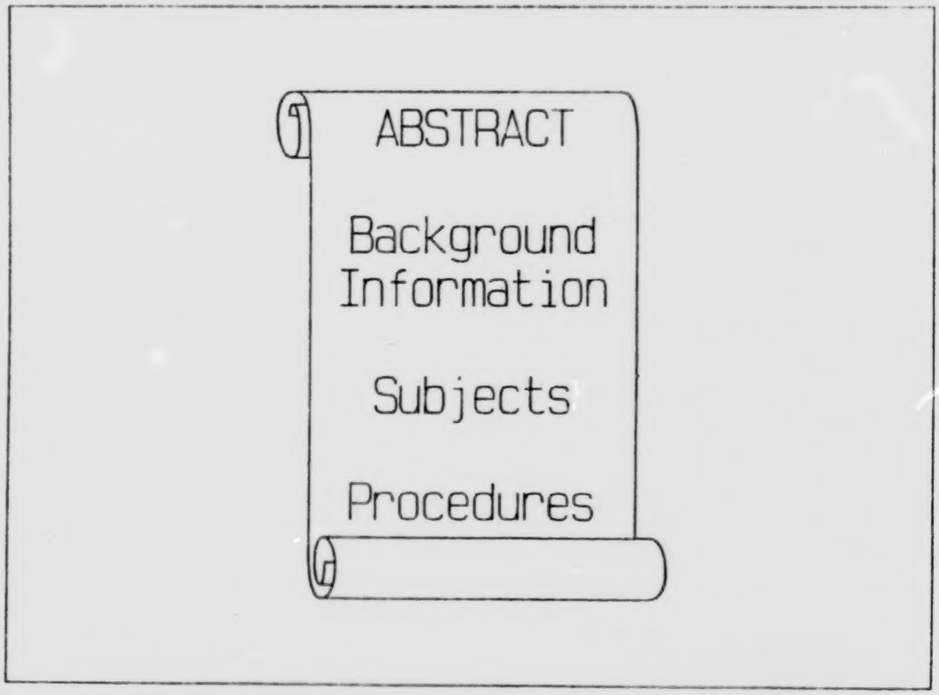

ABSTRACT
Background Information
Subjects
Procedures

Figure 10. *The traditional view of electronic text as a scroll provides an impoverished model as it is misleading and does not show sideways movement.*

1. What was the research issue and the theoretical base?
2. What were the specific applications and the hypotheses?
3. How were the hypotheses operationalized? Was the study experimental or descriptive?
4. What was the research design?
5. What kind of data were collected? Who were the subjects?
6. How were the data collected?
7. How were the data analyzed? What statistical tests were used?
8. Was the results report parsimonious or extrapolated?
9. Were the conclusions consistent with the results reported?
10. What were the internal/external reliability and validity issues?

A rational analysis

Unlike most of the earlier research on reading electronic text, it was a realistic task that people were doing and they were doing what they usually did. When asked for their impressions of how the system worked, the students produced written descriptions like this one: "The system organized the data so it was easy to find the hypothesis, subjects, results, tests, conclusions, etc. Having a system like this makes it easy for one to skim over an article and find a particular piece of data." Another student wrote: "The system seems to function well. It is effective if one knows where the information is and how the paper is arranged (subheadings and where info. can be found). I felt a little frustrated at not being able to see the text in its entirety, as I am used to being able to do so, however I'm confident that with practice and use of the system, the process of locating information will become easier, (quicker and require less thought of where the answers to questions may be). When reading or looking for answers, I like to skim an article first before looking for information. Perhaps I should have done so on the computer, also." Another student complained of reflective glare from the window as the sun shifted while he read and he said, "I felt much more at ease reading from the screen during the last 5-10 minutes of the exercise after I felt I had mastered the machine."

I next asked for drawings because the verbal bias of our culture had appeared: no one had been told to write but all gave a written rather than a pictorial response. None of the students appeared to have the sophisticated skills of a graphic artist. Two students were unable to meet with the request to sketch an impression of the text system's structure and how it functioned. These people were compliant in every way but this instance. One student, similarly compliant, produced a static drawing of the computer. Two students each drew a single vertical column of text with inserted subheads, as in a traditional, single column word processor. These images resembled scrolls and did not show the horizontal turning of pages, see Figure 10. Questioning produced answers suggesting that existing models from prior computer experience had dominated. The exception was the one person who had a reasonably logical model. He was the only left-handed participant, was the slowest reader and was more athletic than any of the others. Possibly he had superior spatial skills and thus drew a more suitable representation of the system. Only this person had developed a reasonably accurate mental model. His drawing, shown in Figure 11, depicts the sections of text as side-by-side and emanating from one point.

The lack of visual thinking is important because these people were only shown how to use the system to access text and were not given any sort of model or explanation of how it worked, unlike the readers of this paper. It is also important that previous experience with text on computer screen apparently induced an erroneous mental model for two of the readers. Although all of the participants had some computer experience, none of them had worked with the Macintosh interface before. The student who came up with the useful model said that in addition to playing baseball he spent a lot of his time playing video games.

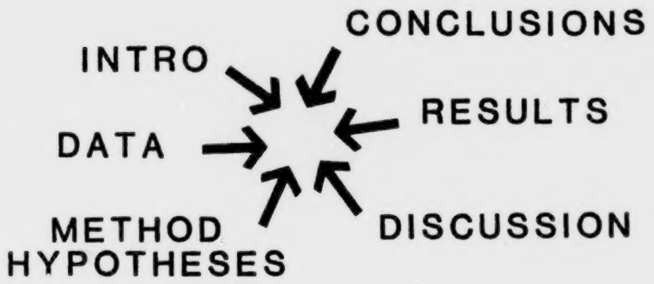

CONCLUSIONS
INTRO
RESULTS
DATA
METHOD
HYPOTHESES
DISCUSSION

Figure 11. *This representation effectively shows the spatial relationships of the columns of text to each other.*

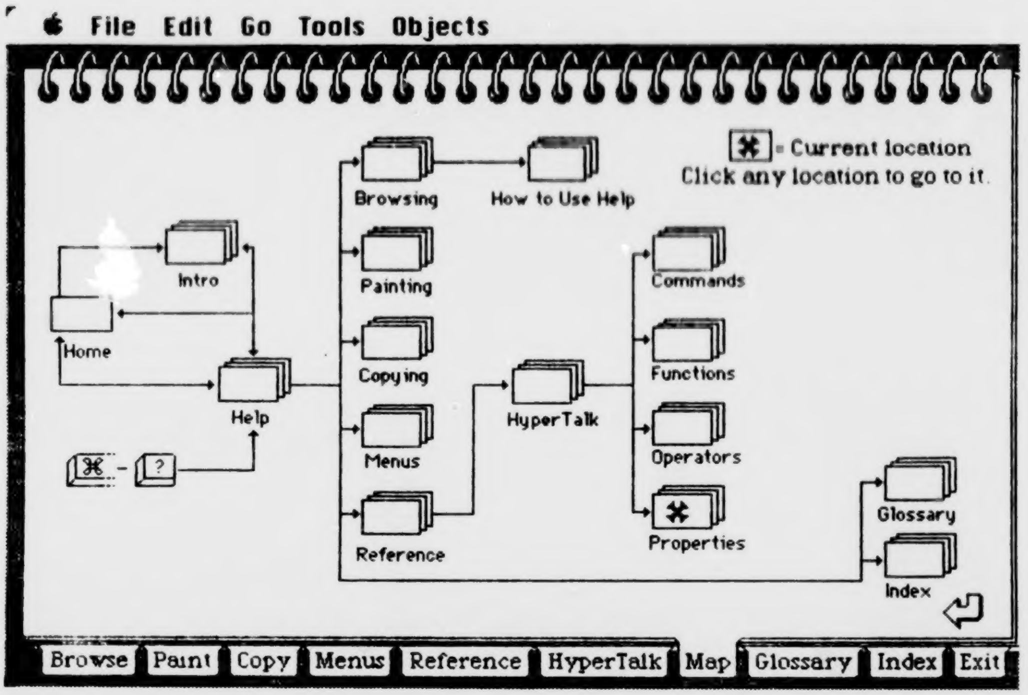

File Edit Go Tools Objects
= Current location
Click any location to go to it.
Browsing
How to Use Help
Intro
Painting
Commands
Home
Copying
Help
HyperTalk
Functions
Menus
Operators
Reference
Properties
Glossary
Index
Browse
Paint
Copy
Menus
Reference
HyperTalk
Map
Glossary
Index
Exit

Figure 12. *Does this map from HyperCard correspond to your mental model?*

Discussion

At this point it is still an assumption that supplying device models may allow readers to learn to use electronic text display systems more effectively than merely giving them directions. However, towards contemplating the design of the instructional aspects of an information delivery system there is value in finding out how readers of electronic text perform and what they think. A future research direction on mental models would be the comparison of a spatial text layout with the same material displayed by a hypertext or a hypermedia program such as those described by Rezabek and Ragan (1988). Their anecdote about people becoming lost in *Guide's* hypertext is probably related to wayfinding in information environments in general. Qualitative research on library signs, for example, has produced a taxonomy for more systematic signing: direction, location and information (Yeaman, 1987c). A related investigation could include these considerations in the testing of device models, perhaps as onscreen illustrations like the map provided in *HyperCard*, see Figure 12.

Conclusions

Regardless of cost and time, the real-life testing of information sytems, such as the one described here, has both practical and theoretical benefits because designers are inside the systems they create and cannot see them in the same way as people who are learning about them. For instance, an intuitively-generated analogy to navigating through a microfiche might have been suggested to participants in the study. Unfortunately, the idea is imprecise because the text is divided into columns by logical sections and not randomly by page number. It is also noteworthy that the readers themselves did not come up with this or any other comparison. However, an instructional version of the most suitable response in the study, see Figure 11, might be a wagon wheel or a circle of interconnected mine shafts. Investigation of the device model's effectiveness could usefully examine either quantitative or qualitative dimensions, if the empiricism is bounded by rationality.

Information access and design, both textual and pictorial, are crucial topics when developing the electronic delivery systems of the near future. Success will come from the evolution of systems that not only people need and can use but also ones they can learn to use. Design *imagination* must be disciplined by scientific and rational assessment of the abilities of real people in the real world. This does not rule out the possibility of some poetic fun when creating a message:

THE TWO PRINCIPLES OF DESIGN

1. **Make things that work.**
2. **Make things that people can use.**
3. **Make things that people can learn to use.**
5. **Make things that look good.**

References

Card, S. K., Moran, T. P. & Newell, A. (1983). *The psychology of human-computer interaction.* Hillsdale, NJ: Erlbaum Associates.

Kerr, S. T. (1987). Finding one's way in electronic space: The relative importance of navigational cues and mental models. *Proceedings of selected research paper presentations at the 1987 Annual Convention of the Association for Educational Communications and Technology*, 374-400.

Kieras, D. E. & Bovair, S. (1984). The role of a mental model in learning to operate a device. *Cognitive Science, 8,* 255-273.

Line, M. B. (1980). Some questions concerning the unprinted word. In P. J. Hills (Ed.), *The future of the printed word: The impact and implications of the new communications technology* (pp. 27-35). Westport, CT: Greenwood Press.

Line, M. B. (1981). Redesigning information packages for electronic transmission. In K. P. Jones and H. Taylor (Eds.), *The design of information systems for human beings: Informatics 6* (pp. 29-39). London: Aslib.

Morita, A. (1986). *Made in Japan: Akio Morita and Sony.* New York: E. P. Dutton.

National Research Council. (1983). *Research needs for human factors.* Washington, D. C.: National Academy Press.

Norman, D. A. (1984). Cognitive engineering principles in the design of human-computer interfaces. In G. Salvendy (Ed.), *Human-computer interaction* (pp. 11-16). Amsterdam: Elsevier Science Publishers B.V.

Rezabek, R. H. & Ragan, T. J. (1988). Hypertext and elaboration theory: Use of visual epitomes for learning complex, multi-topic material. Elsewhere in this volume.

Yeaman, A. R. J. (in press). The Fishbein and Ajzen model of attitude-behavior consistency applied to human-computer interaction. *Proceedings of selected research paper presentations at the 1988 Annual Convention of the Association for Educational Communications and Technology.*

Yeaman, A. R. J. (1984). *Electronic books and legibility: A microcomputer simulation.* University of Washington, Seattle. *Dissertation Abstracts International, 45* , 1273A. University Microfilms No. ADG84-19205.

Yeaman, A. R. J: (1985a). Electronic books: Towards a theoretical framework for research. *Proceedings of selected research paper presentations at the 1985 Annual Convention of the Association for Educational Communications and Technology,* 921-933. (ERIC Document Reproduction Service No. ED 256 345).

Yeaman, A. R. J. (1985b). Personal productivity and transitions in word processing. *Interface 85: the fourth symposium on human factors and industrial design in consumer products,* 35-38.

Yeaman, A. R. J. (1987a). An anthropological view of information technology: Computing as a symbol system. *HFS Computer Systems Group Bulletin, 14* (2), 4-5.

Yeaman, A. R. J. (1987b). Educational communications research and ergonomics. *Research and Theory Division Newsletter, 11* (3), 105-109.

Yeaman, A. R. J. (1987c). Effective communication and better access: Improving the design of library signs. In R. A. Braden, D. G. Beauchamp & L. W. Miller (Eds.), *Visible and viable: The role of images in instruction and communication,* 29-33. Commerce, TX: East Texas State University & International Visual Literacy Association.

Yeaman, A. R. J. (1987d). Electronic text display: An experiment on page turning and window effect. *Proceedings of selected research paper presentations at the 1987 Annual Convention of the Association for Educational Communications and Technology,* 805-817.

A Model for A Scriptwriting Workshop

Barbara Roos

> I once asked D. W. Griffith what he considered the best course to pursue in writing for the screen. He had just completed that unforgettable cinema classic THE BIRTH OF A NATION. He answered, 'Think in pictures'.
>
> Scriptwriting textbook,
> circa 1926

Scripting has always been primarily a matter of finding out how to render a topic visually. Writing copy comes late in the process, and the copy generally supports the visuals rather than the other way around.

Scriptwriting workshops have the potential to serve participants in several ways. For example, they offer general insight into the process of "writing pictures". A scriptwriting workshop offers a forum for discussion about the "rules" and "customs", the "language" of motion media. Throughout the workshop, differences between the language we speak and write and the "language" of the screen can be pointed up. For example:

* images convey the present tense well, the past and future tenses poorly if at all.
* images speak literally rather than hypothetically.
* the grammar of images-in-sequence is an impoverished grammar.
* there are few transitional devices in the grammar of motion media. Most times, the juxtaposition of shot-shot is unmodulated.

Thus, participants come out of a workshop as more sophisticated, more active, consumers of film and television. (1)

Secondly, scripting is enjoyable. Perhaps because media has such a peculiar role in our culture (trivial, yet exciting!) people seem to share a positive and relaxed mindset toward the task before they even begin. The workshop offers an opportunity to exercise one's visual imagination, and to practice making words and visuals work together. Working cooperatively in small groups during the workshop seems to help participants transcend fears about their own creativity and about writing itself.

Finally, some participants will apply the experience to a real script in the real world. The workshop's approach is useful for most scripting tasks, including scripts for public relations, training, informational, and documentary productions, as well as scripts for public service or commercial spot announcements.

Steps in the scripting process are as follows:

#1. Determine the visual strength of the proposed content. Answer the question: "Why not write a book instead"?

#2. Determine a single main idea.

In most of our popular media, the image's meaning and power grows from the realistic quality of that image. (2) This realism, together with the fact that most motion media proceeds at a fixed rate not governed by the viewer, leads viewers to read the screen in a literal and linear fashion. So the scriptwriter has to keep all production elements in line, hooked onto the backbone of a single main idea. Complex arguments, or ideas tangential to the main idea work better in a book.

#3. Create a visual structure to carry viewers from point-to-point.

There must be development, there must be a change in the subject matter between the beginning of the production and its conclusion. There are many kinds of structure: for example, structure may grow from a visual "hook", from an established genre, or from piggybacking onto the structure of a piece of music. Oddly enough, many scriptwriters neglect this third step in script construction entirely, resulting in a script with a pancake profile (flat and dull throughout), a souffle profile (starts well, falls flat), or a beads-on-a-string profile (vignettes follow one another without modulation: dull, dull, dull...)

#4. Finally, scriptwriters write copy.

Here follows a scriptwriting workshop "Lesson Plan". If participants are able to work together during three 1-2 hour workshops, they will benefit from having the time to do some critical viewing of finished productions, and will be able to test their own progress by repeating the first assignment again at the end of the sessions. However,people can have a useful experience in a single hour-long session.

***

During Exercise #1, participants develop a :30 public service announcement. Thirty seconds is long enough to serve as a microcosm of most scripting tasks. But it's also short enough to permit participants to get something done in only ten or fifteen minutes, and to be able to see the structure of what they have done at a glance.

> "Work with one other person. You have about fifteen minutes to develop a script for the Potato Growers of America. The public service announcement must run thirty seconds. It must convince viewers that potatoes are great stuff. You cannot use words (either verbal or print) until the last five seconds, because we potato growers know all about TV and we want our message to look like those great commercials for bluejeans and stuff we see all the time. But you may use music and sound effects if you want to."

Other topics of proven efficacy with groups ranging from corporative executives to junior high school kids include "Portrait of my Hometown" and "Stay in High School".

Ask participants to start by taking a look at the subject in their mind's eye: is it in closeup or wide view? ... do they see it's good points or bad ones? Etc. Then, as necessary, they may want to list some facts about their subject.

Preliminaries over, they must now decide on a single main idea for the PSA. Every topic has many potential main ideas. The ground rule is that the PSA has to be primarily visual, so they must select a main idea it's easy to take a picture of. (3) For example, "stay in school because many interesting things will fill your day".

Have them work in pairs or small groups for fifteen minutes.

....a little bit into the working period, with everybody going strong, interrupt the group. Remind them that freshness is important: viewers won't attend to visual cliches. Don't give them this warning before the creative juices begin to flow or they will sit around for the full fifteen minutes shooting down ideas.

When the time is up, look at what has been accomplished. Some of the scripts will exhibit visual unity, while others will not. Some will exemplify visual thinking, and some will have a visual structure, while others will really be print-thinking papered over with a few illustrations. (4)

Search for these specific accomplishments:

*Where in the work of the group is there a strong opening?
"Strong" = fresh, visual, and relevant to the main idea

*How about a good ending?
"Good" = fresh, visual. Sums up or adds a new twist to the main idea.

*Where is there development?
A "grabber" of an opening image.
A memorable closing image.
And some kind of progress in between, rather than the reiteration of the same image/idea/feeling. Even in :30 there may be room for a "plot point" (5), a new element entering the "story", giving it a spin in a new direction.

*Has anyone come up with a clever hook? A hook is a fresh context placed over the content. A hook enhances the unity of the production. An example of an effective hook for a "Stay in School" PSA, one group came up with, was the idea of "doors". They had all kinds of doors throughout their spot: opening doors, slamming doors, locked doors. Doors contributed both visual and logical unity.

*Has anyone adopted a popular genre? Genres are species of media like "westerns" and "game shows". If a genre can be found to fit the main idea of the PSA, it will help audiences relax into the spot: confident of the form, they are more open to the content.

***

A second exercise takes print copy and turns it into motion media. Give workshop participants a written description of a person, place or thing culled from an instruction manual or textbook.

Ask participants how to begin. The right answer is, begin by finding the main idea and its visual equivalents. The work continues with development of a structure for the main idea. Popular paradigms for the structure of a media production are many, and include traditional narrative, thematic, episodic, and interruptive (in which the piece stops short and the audience is required to complete the meaning).

Participants then consider the composition of the sound track. Commonly, music adds emotional depth to the presentation, sound effects heighten its sense of realism, while words do their logical thing. Then plan the variable dominance of all the channels in the production as the production progresses in time: image, words, music and sound effects. (6) If spoken copy is planned, participants determine the identity of the person behind the words, as that decision dictates the style in which the copy will be written.

Finally, participants write copy. They ought not be overly critical as they write but rather just get it out on the page. Deal with being critical -- be an editor -- as a separate step.

Then test the script:

* Read it aloud. Does the copy trip the tongue? Then simplify. Words, sentences, concepts. And the copy cannot be "too" conversational. Save stuffy for more formal forms of communication. Motion media is by nature up-close-and-personal.

* Offer a friend a script of the production without its copy. If the visuals alone fail to convey the main idea and the basic structure, strengthen those visuals.

* Read aloud, does it sound like a good speech? A good speech is a bad script. Visuals must tell so much of the "story" that the words, experienced in isolation, sound incomplete. In scripts, all the dangling phrases and incomplete sentences of the universe find a home.

Participants interested in going further with the craft of scriptwriting are urged to take a basic media production course along with further course work in scriptwriting. Often, such courses are available at a local public access cable channel, at very small cost. Scriptwriters need a visceral sense of how such visual elements as camera and lens movements and editing transform meaning.

The workshop(s) just described grow from 25 years of professional scriptwriting experience, and 12 years teaching the craft of scriptwriting.

NOTES AND READINGS:

1. Well-written sources for many of the "rules" and "customs" of motion media include John Fiske and John Hartley, READING TELEVISION. Methueun. London, 1978; Louis Giannetti, UNDERSTANDING MOVIES. (Fourth edition) Prentice-Hall, Inc., 1987; and James Monaco, HOW TO READ A FILM. Oxford University Press, 1977.

2. The historical tension between the "realist" and "formative" camps (which latter group finds the main source of film's meaning and power in the transformative power of its artistic conventions) is documented in Dudley Andrews, THE MAJOR FILM THEORIES. Oxford University Press, 1976.

3. Translating non-visual concepts into a form suitable for the screen is one topic best left out of a basic workshop, but if time permits a brief discussion of various approaches to the problem is useful. Methods include editing and other production techniques, the use of animation, and -of course- the use of a spoken narrative.

4. At this point in the proceedings, some workshop participants may ask how to layout scripts on the page. An inexpensive style manual is THE PROFESSIONAL WRITERS TELEPLAY/SCREENPLAY FORMAT, from the Writer's Guild of America, East., Inc. New York. 1977. The guide can be ordered from the Guild at 555 West 57th St., NY 10019. However, style manuals are not really where it's at when working at this stage of the scripting process. Better, make graphic notes of what are, after all, visual ideas: a sketch of how a scene should look, or a diagram of the proposed script's structure.

5. The "plot point" is described by Syd Field in SCREENPLAY: THE FOUNDATIONS OF SCREENWRITING. Dell Trade Paperback, 1982. This is a hum-dinger of a text on writing fictional scripts.

6. There are many good books and articles dealing with the aesthetics of audio tracks. One of the best discussions is contained in Kenneth Roberts and Win Sharples, Jr., A PRIMER FOR FILM-MAKING. Macmillan, 1985.

SECTION III

VISUAL LITERACY AND RESEARCH & THEORY

An Investigation of Narrative Television Comprehension: Factors of Visual Literacy

Rhonda S. Robinson

Background and Introduction

Visual communications inundate today's students, and the ability to interpret and utilize these messages is important to the learning process. While educators study the effect that commercial television and film has had on children, several national groups seriously pursue the goal of creating a more technologically aware and media literate society, in an attempt to nullify the perceived negative effects of viewing television and film (Kahn, 1979, Potter, 1982). The growth of film and television study has lead to the development of both research and application of programs designed to enhance what many are calling "visual literacy".

Sharing many elements with media appreciation or film criticism, visual literacy has been variously defined, and theoretical principles of visual literacy are being developed (Hortin, 1980). Visual literacy is the ability to process elements and interpret visual messages; the ability to understand and appreciate the content and purpose of any image, the structural and aesthetic composition in visual communication (Esdale and Robinson, 1981). An understanding of the structural devices basic to all television and films is one of the main skills in acquiring visual literacy (Foster, 1979).

Educators are acknowledging the increasing importance of including visual literacy or media competencies in the basic communications skills of students Many educators have identified the need for visual literacy and have suggested activities to encourage its development (Potter, 1982; Kahn, 1982; England, 1982; Foster, 1979; Sohn, 1978; Logan, 1977). However, most curricular materials suggest little assessment of skills which could establish base line data or allow for the assessment of growth. While visual literacy has been clearly defined, it has been much less clearly investigated. What is the level of visual literacy of students? How can visual literacy be assessed? Can the various visual abilities be differentiated?

One standardized assessment of visual literacy skills been developed (Turner, 1979). Turner reported that this test was validated for high school students and adults. While curricular materials have been developed to enhance the viewing skills of elementary school age students, no validated assessment has been made available for that age group. The purpose of a previous study (Robinson, 1984) was to refine Turner's standardized visual literacy assessment to allow its utilization with a younger audience. Through a pilot use of this new assessment, the visual literacy of students was evaluated to obtain data for further development of both this instrument and its utilization. Some naturalistic inquiry methods were also piloted.

Much information was gained from this first project. The primary focus of the activity was the development of an acceptable instrument to assess the visual literacy of pre-high school students. However, the larger question addressed the actual methodology and research instruments utilized in investigating visual literacy. While attention was directed at the development, pilot-testing, and refinement of an assessment instrument, the results involved more than the refinement of the instrument.

The pilot test of the assessment involved employing participant - observation methods of data collection. The researcher was directly involved in guiding students and observing their behavior while testing the instrument. Because of this direct involvement, the researcher had an opportunity to interact with students, observe the questions raised, and observe reaction to problems students encountered with their tasks. Consequently, while gaining excellent data pertaining to the development of an assessment instrument, the researcher also gained experience with observation methodology and the problems of investigating or researching visual literacy.

Proponents of visual literacy research have addressed themselves to some of the problems involved in the investigation of visual literacy factors. Cochran (1983) has challenged researchers to consider several important factors in future research. Among these was the idea that naturalistic inquiry methods should be utilized to investigate individual meaning derived from visuals. An interdisciplinary approach was recommended, and research on topics such as the developmental levels of visual literacy skill attainment was suggested.

With this challenge to consider naturalistic inquiry and to investigate levels of visual literacy attainment, the first study focused not only on the development of an assessment instrument but also on the methods of collecting data which could accompany and actually strengthen the utilization of the instrument.

In addition to the new instrument, the project derived much information on naturalistic inquiry. While students were unable to correctly answer "visual literacy" conceptual questions, they were very able to discuss film and television elements. The students revealed, through class discussion and the open-ended questionnaire, a varied understanding of television production elements such as laugh tracks, multiple camera shooting, backdrops, sets, lighting, and sound effects. They could also delineate areas of literary understanding from television, including such elements as plot, characterization, setting, climax, and theme. Overall, students were enthusiastic and cooperative, and many were interested in the results of the investigation. They revealed an active involvement with television and film, and were interested in better understanding the media.

This pilot revealed that another researcher's validated test was inappropriate to the task. The observed discussion revealed a great deal more about student's visual comprehension; the "situation in which people use visual materials" (Cochran et al. 1980) was rich in information not available from the "test." While the instrument had been validated, it was not clear and not usable.

The richest responses were verbal and were recorded for further study. Kerr (1983) recommended that guidelines be developed for the structuring and categorizing of a mass of such data. Guba (1981) has recommended several methods to enhance the trustworthiness and especially the dependability and transferability of data collected in naturalistic inquiry. The results of the first study suggested that triangulation of technique, overlap (repeated) methods, and an audit trail would all be possible improvements in the method of data collection. Results from the study did not indicate that a better written instrument for individual response would provide all the data desired.

Experimental methods could be used to investigate some of the questions addressed in this study. Messaris (1975) has used one such design to investigate viewer's styles of film interpretation (real or created) as they relate to the viewer's familiarity with film study, only to find that "a viewer's past experience does not appear to deflect interpretational styles . . ." (page 16). It would seem that more work, both experimental and naturalistic inquiry, is needed.

Purpose

The previous study discussed above developed and piloted a new version of a visual literacy test for grades six-eight. The study also piloted research methods which were developed to investigate visual ability in these students. The purpose of this study was to utilize this test and these methods to investigate the visual literacy of a larger group of students, and to assess the link between this visual literacy and some aspects of literary comprehension.

Questions providing a focus for this inquiry included:

a. What is the visual literacy of these students - their level of television narrative comprehension?

b. What is the level of media familiarity of these students as measured by the viewing survey?

c. Is there a relationship between their media familiarity and their visual literacy?

d. Is narrative understanding from television related to reading ability (measured by reading scores of homogeneously grouped classes)?

Method

The naturalistic inquiry methods recommended by Guba and others required several different data collection techniques: the revised student questionnaire, student comprehension survey, observation of viewing and discussion, and interviews.

Participants were 150 sixth grade students at a suburban junior high school in St. Charles, Illinois. Students were grouped by reading ability, so class reading levels were determined and recorded on the students questionnaires. Of 151 students, 48% read below grade level, 32% read at grade level, and 20% read above grade level. They were grouped by reading ability in classes averaging 30 in size. The viewing and discussion were held one class at a time in the media viewing area of their resource center, a common setting for the viewing of videotapes. The resource center director and the classroom teachers involved were present during the class activity and participated in the discussion to a small degree.

Materials utilized included the student questionnaire, a taped episode of "Family Ties," a popular situation comedy, discussion questions, and an observation instrument for recording viewing behaviors. Students completed the first section of the questionnaire dealing with viewing habits and media familiarity one week prior to viewing the program.

Procedures

a. Piloted instruments were evaluated for reading level and validity by reading experts.

b. Students voted on their favorite half-hour programs (to be used in study). An episode of their favorite, "Family Ties," was taped from syndicated daytime broadcast so students had not recently seen the episode.

c. Students completed the viewing questions one week prior to observation.

d. In one class period, students viewed one episode, completed the written questionnaire, and discussed the episode briefly. The researcher observed and recorded throughout.

e. Later the same day, ten percent of the students were interviewed to obtain more thorough responses to the student questionnaire and the viewing questions.

Results

Data from the two written instruments were collated and frequencies were determined. Correlations were drawn between students' reading levels, media familiarity as determined by the viewing survey and television literacy as determined by the questionnaire. Data gathered by observation and interview were used to add to and corroborate the survey and questionnaire.

The questions listed in the Purpose section focus the discussion of results gathered from all data collection sources.

1. What is the level of narrative television comprehension?

Narrative comprehension was determined by the questions involving main and secondary characters, setting descriptions, and the order of plot events. Students were first asked their opinion as to whether or not they thought they understood the episode, and the majority thought they did: 76% of the low and medium ability readers and 53% of the high ability readers thought they understood the story very well. However, their responses to the narrative questions did not reveal such clear comprehension.

	High Readers	Med/Low Readers	(in percent)
- could name main character	86	94	
- could name other characters	53	88	
- could order plot events	3	15	
- could describe settings used	53	95	

As the responses clearly indicate, the high reading ability students did not have the highest comprehension of the narrative; the low (below grade level) and medium (at grade level) readers had higher comprehension in all areas of narrative understanding.

Overall, the responses would indicate that the majority of students understood or remembered less than they thought they did. Also, they responded far more accurately to character and setting questions than to plot order questions. In discussion, the students revealed a clear understanding of the plot and theme of the episode. When interviewed, students could detail character relationships, problems, and the outcome of the plot conflict. Clearly, these students understood the episode regardless of their ability to display this comprehension by correctly ordering plot events. They revealed a sensitivity to the plot conflicts ("she'd do anything to get in") and clear satisfaction with the plot resolution ("I'm glad they made up after hurting each other's feelings").

2. What is the media familiarity of these student?

Media familiarity was determined by observation and by questions involving media viewing habits and equipment access. The majority of the students seemed comfortable with the inclusion of video in their class activities; most appeared interested in the study, the program, and the discussion. Rarely were students observed looking away, whispering, or writing, etc. during the viewing. Observation notes included few instances of observable inattention; only two girls in one class were reminded by their teacher to pay attention. (One student was a mainstreamed blind student who was assisted by the teacher in answering the written questionnaire; her answers were deleted.)

The TV viewing questionnaire revealed a fairly high level of media familiarity:

80% owned a VCR
57% saw one or more movies in school per week
50% saw 1-2 films/month at a theater
27% saw 3-4 films/month at a theater
20% saw 5 or more films/month at a theater
45% watched 5 or more movies on television per week
22% watched 3-4 movies on television per week
26% watched 1-2 movies on television per week
7% watched no movies on television per week

A majority of students rented videotaped films to view at home. Of those (80%) owning VCR's, movie rentals were:

36% rented 1-2
17% rented 3-4
23% rented 5 or more per week!

The mean was 2.46 videotapes rented per week. Other television viewing was moderate. 45% watched 2-3 hours/day, 26% watched 4-5 hours/day, 20% watched 6 or more hours/day, and only 6% watched less than 1 hour/day. The mean was 2.58 hours of television/day.

Photography was also familiar to students. Ninety-seven percent owned a camera at home, and 50% said they used a camera often. One third owned a movie camera and one fourth owned and know how to use a video camera. Two thirds played video games at home at least one hour per week.

These students were interested in and familiar with television and other media. While not overwhelmingly involved with viewing or producing media, they were articulate about television, films, and photography. The resource center which served as the study setting was "mediated"; the room contained video equipment, several computers, and a large video tape and software collection. Students mentioned using media in their school research projects and enjoying seeing videotapes in school (86% like video in school).

3. Is there a relationship between media familiarity and visual literacy?

Media familiarity was defined as the combination of viewing habits and production capacities discussed above. A level of visual literacy in this study was determined by a combination of correct resources to questions regarding narrative comprehension of a television episode. After these new groups were tabulated into a high, medium, or low level of media familiarity and a high or medium level of narrative understanding, cross tabulations were drawn:

	narrative understanding	
	medium	high
low media familiarity	10%	5%
medium media familiarity	70%	65%
high media familiarity	19%	30%

As the chart reveals, media familiarity was related to television understanding; more students who were high on one scale were also high on the other. Also, 58% rated high in narrative understanding were rated high in hours of television viewing, so it is possible that television viewing is related to increased understanding of narrative elements.

4. Is narrative understanding from television related to reading ability?

The reading ability of these students was determined by the school district: students were grouped by reading ability. First reading habits were examined, and then relationships between reading ability and narrative understanding were explored.

The high reading ability students did not read more out of school than low ability students. Modes for the two groups were one hour of reading per week for high readers and five hours per week for low ability readers. Low readers overall read more than high ability readers. When a television narrative understanding score was created for students, those at a medium level of understanding read more (average of one more hour per week) than those at a high narrative understanding. This raises some questions as to whether reading (books, magazines, and newspapers) is related to comprehension of television narrative.

Television viewing habits were also examined related to reading habits: low TV viewers averaged 2.5 hours of reading/week; medium TV viewers averaged 3.5 hours/week; and high TV viewers averaged 1.5 hours/week. The last figure makes the most sense; students watching a lot of TV have no reading time. But since medium TV viewers read only an hour more per week than low viewers do, not much can be said about the relationship of reading ability, habits, and TV viewing.

However, reading ability did seem to be related to television narrative understanding: 45% of high reading ability students were high on TV narrative understanding; only 20% of low reading ability students were high on TV understanding; and 52% of low reading ability students were low in TV narrative understanding. So from these responses and combined scores, it would appear that reading ability, more than reading practice, contributes to narrative understanding from television.

Discussion

Much other information was gathered from the various methods. The lack of "experimental controls" in a study like this one prevents the research from showing causality or proving relationships. However, the amount of information gained about students' habits, abilities, and understanding can add to the general knowledge base of students and literacy. It also can raise questions about various issues. Students' familiarity with regular (once a week) programming and its relationship to understanding is one area that needs attention. Another is measuring the effect of short term recall in determining the ability of students to understand; perhaps their low level of accurate ordering of plot elements is more a memory problem than a lack of understanding.

In interviews, students revealed the most personal and intriguing information. They were concerned about the characters on the episode; they had real empathy for their problems. Students identified closely with characters near their own age, and they felt the family was true-to-life. More questions about television's impact, societal effect, and role in students' lives were raised than perhaps were answered by this research. However, a large body of information was created related to student's viewing abilities, reading abilities, and viewing habits.

References

Cassidy, M. F. and Knowlton, J. Q. (1983). Visual literacy: A failed metaphor? *Educational Communication and Technology Journal*, Vol. 32, *2*.

Cochrane, L. (1983). Problems and controversies in research visual literacy. Symposium presentation at A.E.C.T. Conference, New Orleans.

Cochrane, L., et.al. (1980). Exploring approaches to researching visual literacy. *Educational Communication and Technology Journal*, Vol. 28, *4*.

Esdale, B., and Robinson, R. S. (1982). *Viewing in Secondary Language Arts*. Alberta, Canada, Alberta Education.

Foster, H. M. (1979). *The New Literacy: The Language of Film and Television*. Urbana, IL, National Council of Teachers of English.

Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquires. *Educational Communication and Technology Journal*, Vol. 29, *2*.

Hortin, J. (1980). Visual literacy: The theoretical foundations: An investigation of the research, practices, and theories. Doctoral dissertation, Northern Illinois University.

Kahn, L. (1979). A practical guide to critical TV viewing skills. *Media and Methods*, Vol. 16, *2*.

Kerr, S. (1983). A new technique challenges researchers. *Instructional Innovator*, Vol. 28 *5*.

Messaris, P. (1975). Interpretational styles and film training. Unpublished dissertation, University of Pennsylvania.

Messaris, P. The influence of film-related experience on viewer's styles of film interpretation. Unpublished manuscript, University of Pennsylvania.

Potter, R. L. (1982). What kids say about television. *Television and Children*, Vol. 5, *4*.

Robinson, R. S. (1984, January). The impact of television literacy: An investigation of narrative and television comprehension. Dallas, TX: Paper presented at the Association for Educational Communication and Technology National Convention.

Turner, M. L. (1979, March). Visual literacy assessment. New Orleans, LA: Paper presented at the Association for Educational Communication and Technology National Convention (ERIC No. ED 171 329).

Turning Visual Image into Thought Process: Eisenstein's Perceptual Theory as the Basis of Montage Methodology in Film

Ann Marie Seward Barry

In the summer of 1910, the great Russian writer Tolstoy lamented that "the film might be one of the mightiest means of spreading knowledge and great ideas, and yet it only serves to litter people's brains." (Leyda, *Kino* 1960) When he said this, he not only both accurately summed up the social and aesthetic worth of the Russian cinema at the time, but he also portended its future fulfillment as both art and propaganda through experiments in film montage by Kuleshov, Pudovkin, Vertov, and above all, Sergei Eisenstein.

As the initial novelty of moving pictures began to wear off and the possibilities of film as an art form became apparent through the work of the American director David Wark Griffith, the young Soviets--fascinated by film and imbued with revolutionary enthusiasm--found themselves in an extraordinary situation. With the Old Guard crumbling around them and the new Marxist-Leninist order stretching to establish itself as the one legitimate government, all the parts of Russia--its people, its philosophic ideas and political ideals--were coming apart and re-forming into a new whole. The truly perceptive artists of the time were caught up in the process and all areas of artistic expression were revitalized. In film, theatre, art, and literature, masters like Kuleshov, Pudovkin, Eisenstein, Meyerhold, Mayakovsky and Pasternak participated synergistically in a cross-pollination of ideas sustained by a pervasive sense of social evolution.

As artistic innovation followed the direction laid down by political change, film--the newest art form and most revolutionary communication vehicle--became especially important. Not only was it attuned to the political tenets of dialectical materialism because of its dynamic nature, but it also spoke a universal visual language. Unlike any other mass medium or art form, film could speak directly, explicitly and silently to the 160 million people living outside the great cities, most of whom were illiterate and had little or no understanding of the ideological conflicts involved in the Revolution. Because of this unique position, film became an integral part of the *agit-trains* sent out to the provinces to educate the masses on the new socialist order. (Leyda, *Kino* 132) Equipped with printing plant, film laboratory and cutting room, the trains were as revolutionary a concept in mass communication as the ideas they disseminated.

In each town visited by the *agit-trains*, pamphlets and books were distributed, meetings were held, paintings and drawings of other districts were exchanged, concerts and theatre performances were given, and films were shown in the streets at night. One *agit-steamboat*, the *Red Star*, boasted a full film crew and towed a barge cinema that seated eight hundred people. (Leyda, *Kino* 138,139) Clearly, film was considered an essential part of the propaganda process. Lunacharsky, Education Commissar at the time, commented on film's importance to the New Order: "the moving picture will be utilized to the very fullest extent for amusement and education. The story of humanity will be told in pictures [without] bloodshed and violence . . . race or religious bigotry and hatred: the cinema will be used to teach citizenship and love of humanity." (Leyda, *Kino* 137) The dream was infectious, and film was to be a prime medium for its transmission.

Before the 1917 upheaval, Russian cinema was generally both ponderous and vacuously ornamental; but now the air was electric, ecstatic--it was a unique period of political revolution and artistic experimentation, and the new art of cinema was welcomed both aesthetically and pragmatically. By the reign of Stalin, Soviet cinema again became heavy and unremittingly didactic under the political imperative of "socialist realism." But in between the bureaucracies, the arts were alive with youthful enthusiasm and idealism.

As the director of the First Moscow Worker's Theatre in 1922, for example, Sergei Eisenstein himself tells us of his ideological commitment and its relation to art: "I was one of the most unbending supporters of LEF [the Revolutionary Left Front], where we wanted *the new*, meaning works that would correspond to the new social conditions of art." (*Film Essays* 13) Already comfortable through his engineering studies with the concept of conflicting tensions balanced to create a third directional force, Eisenstein merged his own linguistic abilities--he read and spoke Russian, English, French and German--with the Hegelian-Marxian dialectic of thesis-antithesis-synthesis to form what he called "intellectual montage." It was, in effect, a new language, created out of the film image and syntactically structured according to the philosophical dictates of dialectical materialism.

A new language: to understand what this entailed and how Eisenstein envisioned it as working, one must look at film both pragmatically and aesthetically. Beginning with the material nature of film--i.e., with the raw film stock itself, Eisenstein extended political ideology into film aesthetics by defining the art of film as the art of editing--i.e., the effect of one image on a subsequent opposing image. The dialectical relationship between the images created the film's meaning and its aesthetic as well. Both were grounded in the means of production and in the dynamic forces governing the perception of its material images.

During the final cutting of his 1927 film *October*, Eisenstein described this link between image and thought: "Lenin said 'the cinema is the most important of all the arts.' We firmly believe this, [that] the innovations of our cinema in form, organization, and technique have been possible only as a result of our social innovations, as a result of our social order and the new modes of thought it has stimulated." (*Film Essays* 23)

By putting together colliding images to create deliberate disunity, Eisenstein evolved a blueprint theory for making images function as a universal language. He deliberately avoided the narrative continuity characteristic of contemporary film in favor of a tension between images in time, space, shape and rhythm. He set his images in counterpoint, reasoning that a dialectical collision of images would force the *viewer* to resolve the conflict and to derive a meaning not implicit in any of the individual film frames.

For Eisenstein, then, the significance of film as an art form rested in the *relationship* between the images formed by the mind of the viewer. The process was a dialectical one, both derived from and parallel to Marxist-Leninist thought, one which required the viewer to be an active participant in creating the meaning of the events shown on the screen.

The Japanese ideogram illustrates simply and clearly what Eisenstein had in mind in formulating his dialectical montage theory. Fascinated by both the Japanese language and under the spell of the Kabuki Theatre which performed in Moscow and Leningrad in 1928, Eisenstein wrote an enthusiastic essay on "The Cinematographic Principle and the Ideogram." Excited by the ability of the ideogram to create a concept through the simple juxtaposition of separate hieroglyphs, Eisenstein explains that the ideogram's combination

> of two hieroglyphs of the simplest series is to be regarded not as their sum, but as their product, i.e., as a value of another dimension, another degree; each, separately, corresponds to an *object*, to a fact, but their combination corresponds to a *concept* . . . From separate hieroglyphs has fused--the ideogram. By the combination of two 'depictables' is achieved the representation of something that is graphically undepictable.
>
> For example: the picture for water and the picture of an eye signifies 'to weep'; the picture of an ear near the drawing of a door = 'to listen';
> a dog + a mouth = 'to bark';
> a mouth + a child = 'to scream';
> a mouth + a bird = 'to sing';
> a knife + a heart = 'sorrow,' and so on.
> But this is--montage!
>
> Yes. It is exactly what we do in the cinema, combining shots that are *depictive*, single in meaning, neutral in content--into *intellectual* contexts and series. (*Film Form* 30)

While other filmmakers continued to make films based on narrative continuity in the Aristotelean tradition, Eisenstein manipulated a deliberate discontinuity through the collision of ideographical images. It was a process which broke down ideas into their most basic images and re-formed them dynamically into new wholes. "For us," Eisenstein states,

> *quantitative accumulation*. . . was not enough: we sought for and found in juxtapositions more than that--*a qualitative leap*.
>
> The leap proved beyond the *limits of the possibilities* of the stage--a leap beyond the *limits of situation*: a leap into the field of montage *image*, montage *understanding*, montage as a means before all else of revealing the *ideological conception*. . .
>
> . . . we were extending the frame of parallel montage into new quality, into a new realm: from the sphere of action into the sphere of significance. (*Film Form* 239, 245)

This significance, of course, was the synthesis of dialectical images into socialist thought. Eisenstein theorized that in watching a dialectically composed film, the viewer was also forced into dialectical thinking: film ideologically composed, he believed, would by perceptual necessity yield ideologically correct thought. Years before Marshall McLuhan, Sergei Eisenstein was clearly proposing that the medium is indeed the message. He explains that through the medium of film,

> . . . the spectator is compelled to proceed along that selfsame road that the author traveled in creating the image.
>
> The spectator not only sees the represented elements of the finished work, but also experiences the dynamic process of the emergence and assembly of the image just as it was experienced by the author . . . (*Film Essays* 32)

By 1929, five years after leaving the theatre to produce films, Eisenstein was convinced that film was "art's highest form." He summarized it succinctly in his essay "A Dialectic Approach to Film Form":

> The projection of the dialectic system of things into the brain
> *into creating abstractly*
> *into the process of thinking*
> yields: dialectic methods of thinking;
> dialectical materialism-- PHILOSOPHY.
>
> The projection of the same system of things
> *while creating concretely*
> *while giving form*
> yields: ART. (*Film Form* 45)

In this way Eisenstein's great intellect attempted to encompass all art forms and to align them with the ideological spirit of the 1917 Revolution. For a clearer understanding of how Eisenstein used dialectical montage to direct thought process, let us take a close look at Eisenstein's most influential film, *The Battleship Potemkin..*

In the film's best known sequence, the slaughter on the Odessa Steps, Eisenstein clearly illustrates his use of counterpoint images to create dialectical conflict. In the steps themselves, we see a succession of horizontal lines which move downward on the screen. With only soldiers' boots to fill the frame, both the feet and the steps themselves seem to crush the people below. The soldiers--whose faces are deliberately omitted from the frames, become an anonymous, impersonal czarist force which massacres men, women and children as it descends the stairs. Only the soldiers' hands, bayonets, and boots are used in the oppressively horizontal sequence. Shadow is likewise emphasized to evoke fear and to reinforce horizontal planes. Stark contrasts in light and dark areas and geometric planes achieve dynamic conflict.

In addition to dialectically juxtaposing his shots, Eisenstein also conceived of his sequences in terms of conflict as well, with each sequence acting antithetically to the previous one. Thus the Steps sequence as a whole contrasts to the one before it, where Eisenstein visually creates a sense of the dignity of the masses and the revolutionary cause by emphasizing both light and verticality in relation to the people and their boats. Bright light and vertical lines dominate the frames which focus on the Odessa columns, the sails of the boats joining the battleship, the pillars of the Odessa bridge, and even the top-mast of the revolutionary *Potemkin* herself. The movement of water and people, architectural arches, curvilinear queues of mourners: all these create an organic fluidity of humanity and warmth, against which the hardness of the steps and the mechanical movement of the soldiers appears in dramatic contrast.

In addition to spatial counterpoint within the shot and the sequence, Eisenstein also utilizes temporal discontinuity, stretching screen time beyond plot time to create further tension. By quickly alternating shots, he creates a perceptual explosion just as the soldiers fire their rifles; and by repeating the same action again and again from conflicting camera angles, he causes both time and space to collide, reinforcing the sense of chaos in the "flight" down the steps. At the same time, psychological tension is produced through conflicting geometric planes--triangles, circles, diagonals, and through a quickening montage rhythm as shots focusing on individuals are cross-cut with long shots of the fleeing masses. Spatial, temporal and linear discontinuity thus become rhetorical devices through which Eisenstein argues the ideological concept of socialism and the inevitability of the 1917 Revolution.

It is also important to note, however, that Eisenstein does not entirely abandon traditional narrative continuity. Rather, he uses it to reinforce his dynamic concepts and to give his film an artistic unity apart from the ideological one. *Potemkin*, for example, is consciously composed not only visually as dialectical montage but also formally as a classical tragedy with the masses acting as tragic hero. The Odessa Steps sequence, which Eisenstein conceived on location when he saw the spatial and rhythmic potential of the "flight" of stairs, and which he ultimately called "the very backbone of the organic structure of the film," (*Battleship Potemkin* 45) is also the fourth of five acts which compose the film. As each act is developed in dialectical contrast to the previous one, it also establishes its own rising action and climax: every act begins in passivity, is incited to action by a specific incident, defines the opposition of forces through the inciting incident, and builds its tension to a turning point which yields a new synthesis.

This synthesis, like Aristotelean catharsis, is intended to both release emotion and lead the viewer to the intellectual affirmation of universal brotherhood. A thematic sense of compositional, ideological and spiritual unity thus develops from the internal structural conflict between the many and the one, and the outcome of the dialectic reflects this. The one (the imperialist government) attempts to suppress the many (the proletariat), but is in turn defeated by the unification of Russia (the many as one) through the Communist ideal.

In each act, the action moves from the static to the dynamic, and from the passive to the active:

1. Men and Maggots (quiescent acceptance --> repulsion)
2. Drama on the Quarterdeck (oppression --> mutiny)
3. Appeal From the Dead (mourning --> wrath)
4. The Odessa Steps (lyric fraternization --> mechanistic destruction)
5. Meeting the Squadron (anxiety --> triumph). (*Film Form* 164)

In this way Eisenstein consciously leads the spectator through "a formula of development" which emotionally and intellectually transforms him from what Eisenstein called "a single vegetative unit" into a "collective social unit, consciously participating in its development." (*Film Form* 168) The leap in each "act" of *Potemkin* occurs at a specific moment which signals the burst from one emotion into another--"a transition from quantity to quality" which "compels us, echoing its movement, to *re-live* the moments . . . of all dialectical processes." (*Film Form* 173)

It is this moment which is intended by Eisenstein as an epiphany to transform the visual image into ideological certitude. The turning point of the entire action, the death of Vakulinchuk, occurs in the exact middle of the five "acts," and is meant to result in the spontaneous insight of brotherhood in both the film action and in the viewer's mind. The raising of the red flag at the same moment visually signals the psychological transmutation of image into conviction. In a propagandistic parallel to Aristotelean catharsis, Eisenstein is self-admittedly attempting to direct emotion and to control thought through the film medium.

Given Eisenstein's considerable ability to manipulate both image content and montage methodology, it is no wonder that when he and James Joyce discussed artistic structure in Paris in 1929, Joyce concluded that Eisenstein was one of only two men capable of filming his novel *Ulysses*. (*Film Form* 104) Though in different media, both were working on ways to evoke emotional response, to image inner mental process, and to create a unified aesthetic through disjunctive content and the dialectical positioning of images. Eisenstein showed Joyce the visual process whereby form, content, and effect could become one, transforming thought into art and art into thought: "The image planned by author, director and actor," Eisenstein stated, "is concretized by them in separate representational elements and is assembled--again and finally--in the spectator's perception. This is actually the final aim of every artist's creative endeavor." (*Film Essays* 31)

Whether or not film actually can succeed in doing this in precisely this way may be a matter for psychological debate, but that Eisenstein's *Potemkin* achieved an overwhelming impact on its viewers cannot be doubted. Its genius was proclaimed not only throughout the Soviet Union, but also throughout the world, and its political impact caused numerous governments very real cause for alarm. Wherever *Potemkin* played, even the most die-hard imperialists found themselves applauding the revolutionaries of the Battleship.

Even if one doubts the ability of montage editing to produce philosophical conviction, it is impossible to deny the emotional impact of its effect. Centering his film around the single incident of the mutiny of the Potemkin in 1905, Eisenstein develops a compelling rhetorical argument intended to justify the whole of the 1917 October Revolution. Using an emotional appeal and creating a false dilemma of logic, Eisenstein reduces a complex problem to an absolute "either/or" choice by presenting only those dialectical images which have some recognizable validity in human experience and which are extreme enough to incite emotional response.

By attributing actions which violate basic sacrosanct relationships to the czar and his imperialistic policies--as with the violation of the biological bond between mother and child on the Odessa Steps, and the close link between man and his justly earned bread on board the Battleship, Eisenstein succeeds in associating all economic and military injustice with the Old Guard and all righteous humanism with the New. The film clearly implies through its subject matter and its editing methodology that socialist revolution is the only alternative to social injustice.

Certainly in combination, Eisenstein's mise-en-scene and editing build an effective emotional response which tends to bypass the process of rational scrutiny, at least during viewing time. Recognizing this fact and responding to it through governmental channels, officials from a variety of countries moved to have the film entirely or partially banned immediately upon its release. When the film was shown in Berlin, for example, the Reichs Ministry of Internal Affairs advocated and accomplished a complete ban on the film for all soldiers of the armed forces and all German youth, and a partial ban of certain scenes for the general public--notably the most emotionally involving scenes of the Odessa Steps sequence. Denounced by the German Minister as an "insidious and dangerous beast which has seized the State by the throat . . . ," (*Battleship Potemkin* 134) the film provoked numerous protests, both against and for it. Douglas Fairbanks, for example, was so impressed when he saw the film both in Russia and Germany that he signed Eisenstein to direct a film for United Artists on any subject he liked. (*Battleship Potemkin* 215)

Albert Einstein reportedly "was literally stunned. . . . He approved, exclaimed, proclaiming to [other] viewers in a provocative roar." (*Battleship Potemkin* 132)

When Meyerhold arranged an exclusive showing of *Potemkin* in Moscow, his pianist's description of the film's reception was fairly typical of the responses of international audiences wherever it was shown. "The ticket line," he tells us,

> skirted along the whole theatre building and turned down for a great distance along to the theatre's main entrance. Foreigners arrived, those resident in Moscow and those chanced to be guests in Moscow at the time.
>
> And then came the picture's first shots. . . . The hall had never sat so hushed and attentive. The further the picture advanced with its weighty mass, the more and more frequently did bursts of applause rise from the hall. The red flag [the flag of revolution which had been hand-tinted in the individual prints] brought a stormy ovation. Some Germans sitting in the back row yelled something in German. Someone sang 'The International' in French . . .
>
> Finally, the last reel . . . the picture's last shots and the avalanche of final chords. The whole hall, standing applauds . . . The second and third performances run exactly like the first. (*Battleship Potemkin* 112-113)

Thus in utilizing his engineer's understanding of stress, inspired by dialectical materialism, and influenced by the concept of the Japanese ideogram, Eisenstein developed a perceptual aesthetic and a theory of film language which not only merged his political and artistic goals but also excited his audience to subtly ideological attitudes and feelings. In doing so, he succeeded in creating a semiological system of film which transformed it from 'brain litter' into what both he and Tolstoy knew film could be: a dynamic art of moving images and 'one of the mightiest means of spreading knowledge and great ideas' ever developed by man.

Works Cited

The Battleship Potemkin. Dir. Sergei Eisenstein. Mosfilm, 1926..

Eisenstein, Sergei. *Film Essays and a Lecture.* Ed. Jay Leyda. Princeton: Princeton UP, 1982.

_____ . *Film Form.* Trans. and ed. Jay Leyda. New York: Harcourt Brace Javanovich, 1949.

_____ . *The Film Sense.* rev. ed. Trans and ed. Jay Leyda. New York: Harcourt Brace Javanovich, 1975.

Leyda, Jay. *Kino.* 3rd ed. Princeton: Princeton UP, 1983.

_____ , and Zina Voynow. *Eisenstein at Work.* New York: Pantheon/Museum of Modern Art, 1982.

Marshall, Herbert, ed. *The Battleship Potemkin.* U.S.A.: Avon, 1978.

Interpretation of Image Content

Rune Petterson

Abstract

During the last few years we have undertaken a series of experiments and studies concerning interpretation of image content. Subjects have been given several different assignments. Thus subjects have been asked to name image contents, to describe image contents, to index image contents, to write legends, to assess image contents, to create images, to complete a story, to illustrate a story and to produce informative materials. Results from these experiments, based on more than 62,800 verbal and visual statements from 3,100 subjucts, confirm the theory of a dual stage perception. It is suggested that different assignments cause perception and image interpretation on different cognitive levels.

Introduction

A picture is a multidimensional representation of an inner or of an external reality depicting the physical structure of the objects or events they represent. A picture can also be described as a more or less complicated sense of vision, i. e. awareness of the stimulation of the eye's vision perception cells, with a specific content. An inner image, a visual experience, can originate in thoughts and in dreams. It may be caused by words, i.e. a picture description, without any help of actual pictures.

Every possible visual, every *format* has different possibilities to supply a specific content. This depends on the choice of material and type of production. At Tsukuba Expo -85 in Japan it was possible to view an image on about a four square centimeter wrist watch television and at the same time look at the same image on the Sony Jumbotron with a one thousand square meter screen, that is 2.3 million times larger. It is easy to understand that these pictures can give the viewer different perceptions even though they had the same content.

Dwyer (1978) and his associates have conducted over 200 studies on the effects of pictures on the learning of factual information. Text and illustrations of the human heart have been presented through a variety of formats such as booklets, television and slide-audiotape presentations. It has been concluded that line drawings generally are most effective in formats where the learner's study time is fixed and limited. More realistic versions of art work however, may be more effective in formats where unlimited study time is allowed.

An artist or a painter producing a picture may use lead, crayons, Indian ink, various kinds of paint, paper, canvas and several other kinds of materials in different combinations. The actual picture is built up of materials and pigments which, according to intentions, can be completely separated or gradually mixed.

Apart from printing of line drawings pictures have to be divided in small elements in the technical process of duplicating. In printing, the picture is divided by using a screen. The printed dots vary in size. Thus it is possible to reproduce photos, drawings, and other originals with scales of gray and color. Film pictures, on paper or film, consist of small grain or pigments which are developed in chemico-technical processes. A televisionimage is built up of lines or picture elements. Today's systems use about a quarter of a million picture elements. However, better systems have already been developed. In my view a detailed picture needs to be divided into at least four million picture elements to be satisfactorily presented on a TVscreen. Since each single picture element has the ability to change according to the greyscale and color contents, no less than one hundred million bits of information are needed. Thus a large computer capacity is needed, especially where film and TVimages are concerned. A common denominator for most types of duplicated pictures is their structure with picture elements. Normally, these dots or picture elements are very small. At normal reading distance they can hardly be seen.

An important difference among main categories of pictures is the use of light. All pictures printed in books, magazines, papers and other printed matter are seen in normal directed lighting. In TV and computer screens the light comes from behind and through the image. Films, slides and overhead transparencies are usually projected on a screen.

In picture archives images are stored as *objects* , that is as originals or as copies. For storage in picture databases a transformation of the image content to analogous or digital signals is needed (Figure 1).

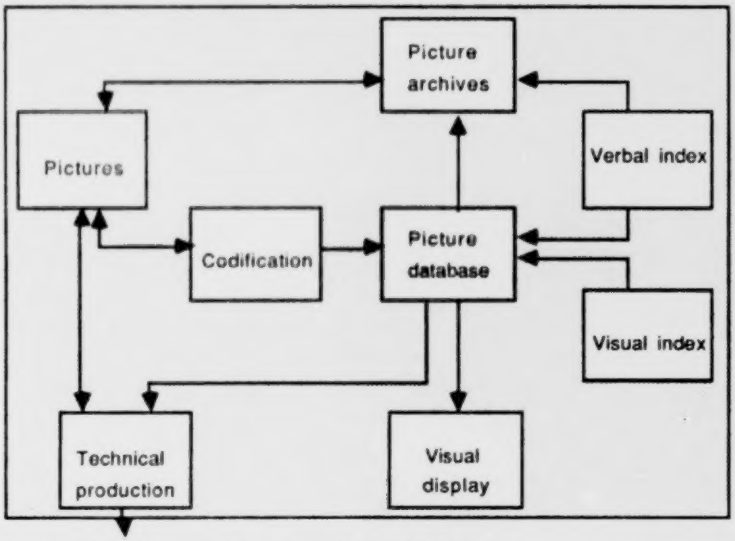


Figure 1. Pictures may be stored in picture archives and picture databases.

A large number of indexing systems has been devised to guide access to individual images (Pettersson, 1986 a). However, real life experience shows that it is often very hard to find the intended image. It is known from several experiments that images are perceived in many different ways by various subjects (Pettersson, 1985, 1986 b). Even simple line drawings evoke many associations. Vogel et. al. (1986) showed that image-enhancement intended to improve interpretation of image content sometimes got in the way of the message. They concluded that image-enhancement graphics should be used selectively and carefully. When in doubt, they recommended plain text should be used. Limburg (1987) pointed out that receivers have even more ambiguity or semantic diversity with visual images than with most expressions of written language with its manifold meanings. Lodding (1983) reported on the problems with misinterpretations of icons used in computer systems. However, he concluded that people find a naturalness in dealing with images either as an aid to or, in some circumstances, as the sole means of communicating.

In a proposed "cognitive model" (Pettersson, 1986c,) five "perception levels" are discussed. These are:

1. being aware of the presence of text, music and pictures
2. looking at text, hearing music, and looking at pictures
3. reading text, listening to music, and reading pictures
4. analyzing text, music and pictures, and
5. creating text, music and pictures.

It is assumed that higher levels activate more mental activities and consume more energy.

During the last few years we have undertaken a series of experiments and studies concerning ***interpretation of image content***. Subjects have been given several different assignments. Thus subjects have been asked to name image contents, to describe image contents, to index image contents, to write legends, to assess image contents, to create images, to complete a story, to illustrate a story and to produce informative materials. Results from these experiments are briefly summarized below.

Assignments

To name image contents

When Snodgrass and Vanderwart (1980) asked 219 subjects to ***name*** 260 simple line drawings with concrete image contents such as "a doll", "a finger", and "a trumpet," they found that 80 per cent of the pictures were given the anticipated answers.

In a study, 80 adult subjects were shown five illustrations.These concrete image subjects showed "two house martins in flight," "a young tadpole," "a squirrel with a nut between its front paws," "a gnawed spruce cone," and "a bird nesting box." In this paper these drawings will be referred to as "the five illustrations." Subjects were asked to ***describe the content*** of each image. All subjects answered with very concrete and directly content-related, descriptive words. Usually two or three different words were used for each picture (table 1.)

Table 1. Answers to the question: "What is the content in this image?

Picture	Number of words	Number of different words	Frequency (%) for the most common word
1	80	3	46,3
2	80	4	43,8
3	80	2	92,5
4	80	3	46,3
5	80	2	73,8
m	80	2,8	60,5

n = 80 subjects, 400 words

One of the five illustrations ("two house martins in flight") had been used in a previous study of eyemovements (Pettersson, 1983a). Within one or two seconds ("immediately") subjects recognized the concrete image content ("two birds" or "two flying birds") in the picture. This has also been true of other eye-movement experiments, for example Potter & Levy (1969).These results all indicate that there is an *image interpretation mode* in which the "whole" and "immediate", concrete contents of an image are perceived.

To describe image contents

Subjects have been asked to make descriptions of the contents of images (Pettersson, 1985, 1986b.) In one case, 80 subjects (other than those mentioned above) made ***brief descriptions*** of ten pictures, all intended to convey abstract image contents. Only some (12.5%) of these 800 descriptions contained the anticipated "key words." Each picture was described with several different descriptive words. The 80 subjects utilized 1406 words which can be regarded as "key words." For each picture the number of different key words ranged from 31 to 51 with a mean value of 37.6. The four most common key words for each picture accounted for half of all the key word designations (51%.) Most of the designations were only mentioned once or a couple of times.

In a subsequent experiment, 50 subjects have made ***detailed descriptions*** of "the five illustrations." These descriptions comprised 15 to 300 words. Here too, a large variety of descriptive words were used. Mean values were between 59 and 119 words.

To index image contents

Copies of "the five illustrations" were also given to 97 other subjects. However, this time subjects were given the following task:"These five pictures are to be filed in a picture archive. Write one or more ***index words*** for each picture."

In this case, subjects answered with 38 to 51 different index words for each picture with a mean value of 43.0 (table 2 and figure 2.) A total of 800 words were used. The words expressed in the first study were always the most common in this test. On average they account for some 45 per cent of all the words used as index words for each picture. The three most common index designations for each picture accounted for half of all the index designations (51.3%.) Most of the designations were only mentioned once (64.7%) or twice (10.2%.)Concrete, descriptive designations dominated.Thus this study confirms the findings from the previous study with brief descriptions.

Table 2. Answers to the task: "These pictures are going to be put in a picture archive. Please write one or more indexwords for each image."

Picture	Number of words	Number of different words	Frequency (%) for the most common word
1	226	44	29.2
2	120	38	25.8
3	183	42	35.5
4	103	40	25.2
5	168	51	32.1
m	160	43.0	29.6

n = 97 subjects, 800 words

A comparison of the results presented in the two tables (1 and 2) shows that an average of fifteen times more words were used in the latter case (mean values were 43.0 and 2.8).

The suggested index words can be organized into various hierarchic structures with abstract and concrete words, as well as synonyms and near synonyms. Several of the words that were used clearly show that the images have been carefully studied.These results all indicate that there is an *image interpretation mode* in which details and the abstract contents in an image are perceived.

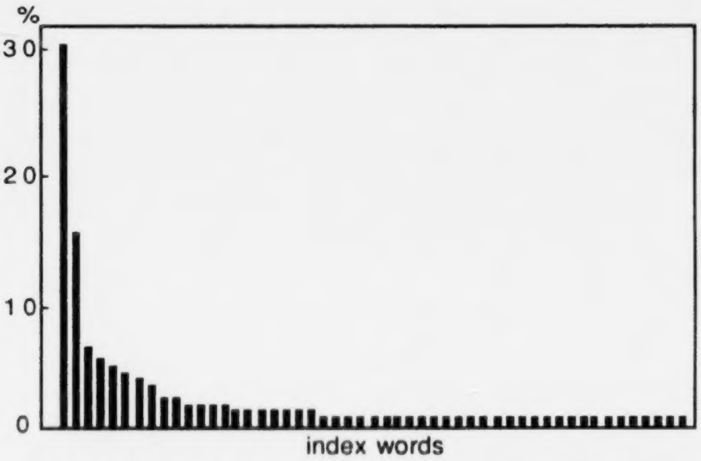


Figure 2. Average frequency of index words. The three most common words account for more than half of the 800 designations.

To write legends

Ten pictures where shown to some 50 students taking a course in visual communication. The students were asked to ***compose legends*** which were (1.) positive and reinforced image contents, (2.) negative and weakened image contents and (3.) neutral and neither reinforced nor weakened image contents. A subsequent review of the legends (approximately 1200) and also discussions in class showed that picture legends clearly have an ability to affect our perception of the image content. Actually *the legend has a very great impact on our image perception*. It might be said that *"to a large degree readers see what they are told to see in an image."* This is also shown in eye-movement studies (Pettersson, 1986c).

To rank and rate images

Experiments with rankings and ratings of pictures (Pettersson,1984) showed that picture readability is positively correlated with both aesthetic ratings and assessed usefulness in teaching. Studies on bar chart design (Ek & Frederiksen, 1986) concluded that we can make screen design *according to aesthetic appeal.*

To assess image contents

In one study (Pettersson, 1985) 46 "senders" as well as 80 "receivers" assessed image contents. Results showed that for seven out of ten pictures there was a significant difference between the intended and the perceived image content. The above pictures were all mounted on cardboard paper in the A3 format (29.7 x 42.1 centimeters). In a follow-up study slides were made of the five drawings. These slides were then shown to and rated by 113 adult subjects at the UREX image laboratory in Finland.

In the first study, a semantic differential scale was used. The verbal ratings "very poor," "rather poor," "neither poor nor good," "rather good" and "very good" were supplemented with a numerical value from zero to one hundred. For practical reasons a Likert scale ("very poor," "rather poor," "rather good" and "very good") had to be used in the second study. Thus results from the two studies are not exactly and immediately comparable. However, these two studies show a remarkable similarity of results (table 3). In both cases pictures were rated very much the same. In this case it can be concluded that ***content was more important than format.***

Table 3. Results from assessments of image contents.

Image content	1: paperimages rating 1)	s	2: slides rating 2)
credibility	56	26	59
togetherness	65	22	64
courage	67	20	63
suspiciousness	74	16	74
aggression	76	19	79

1) mean ratings for 80 subjects (according to a semantic differential scale 0 -100, where the interval 60 - 80 is designated "rather good")
2) percent of 113 subjects who rated the image as "rather good" or "very good" according to a Likert scale ("very poor," "rather poor," "rather good" and " very good")

To create images

In four different experiments, art and design students in Sweden have been assigned the task of ***making pictures*** according to various instructions (Pettersson, 1984, 1985 and 1986b.) These experiments resulted in a variety of pictures (almost 600.) There is no doubt that *an intended content can be expressed using many different images*. It is also quite clear that *different people perceive and depict a given text in widely differing ways*. ***Content is more important than format.***

In visual language, non-meaningful basic elements (dots, lines and areas) are put together into shapes which are combined into syntagms or sub-meanings (Pettersson, 1987.) Syntagms can be part of complete meanings which in turn can be sub-meanings to other complete meanings. The basic elements can be put together in different ways, thus forming different images.

In an experiment, subjects were given three sets of basic elements. They were given the assignment, "Combine the basic elements on each piece of paper into an image." The efforts resulted in three series of pictures which were very different in their execution. According to image contents the pictures were grouped in various categories (table 4). Contents comprised groups like eye, cat, bird, face, animal, person and also abstract ones (27%.) The basic elements had been produced by taking original pictures apart electronically. The elements were mixed in a new way and some got new orientations before they were printed out in hard copy formats (figure 3).

Table 4. Results of the assignment: "Combine the basic elements on each piece of paper into an image."

Set of basic elements	Number of image categories	Frequency with the intended image content (%)
1 (eye)	6	20
2 (cat)	5	20
3 (bird)	5	30

n1 = 42, n2 = 30 and n3 = 30 subjects

It can be concluded that *a given set of basic elements can be combined to form various completley different images.*

The same subjects were also given a picture in which they were asked to use white ink and eliminate one hundred dots without changing the image contents. They all succeeded. Results fully confirmed earlier findings (Petterson 1986d). *We can delete , add or shift information in an image without drastically affecting perception of image contents* .

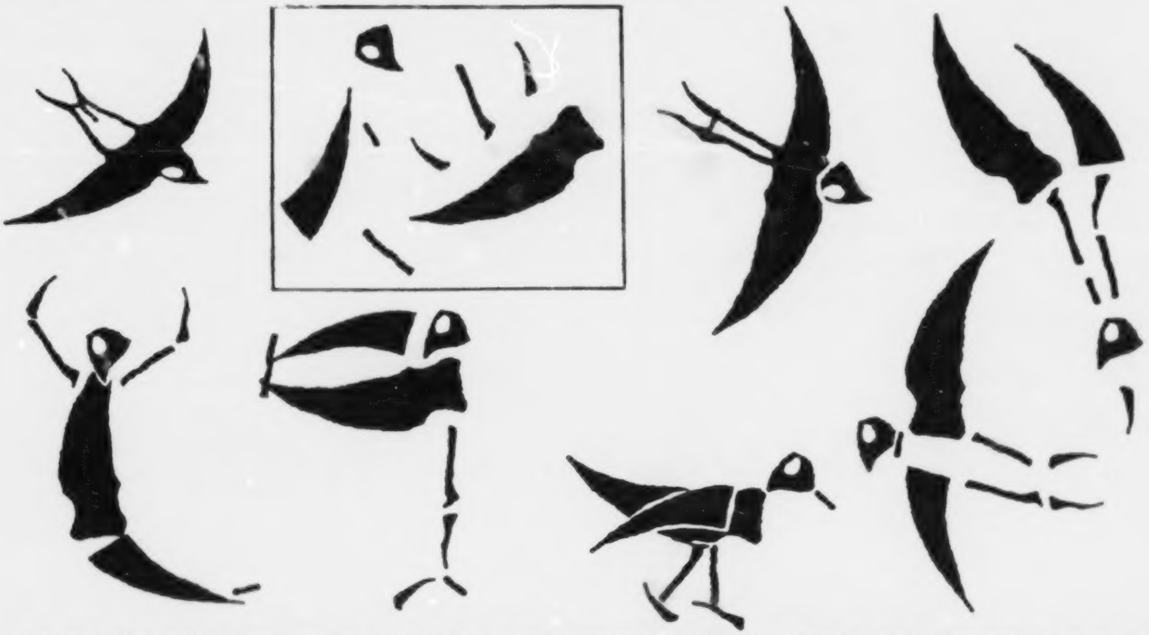


Figure 3. One of the pictures (upper left) that was taken apart to a set of basic elements (in the box) and six examples of images created by subjects taking part in the experiment. Here all pictures have been reduced in size.

To complete a story

In comic strips the verbal information is carefully integrated into the visuals. Voice balloons indicate a dialogue and a sequence in time. Characters in a comic strip may be compared with actors in a movie or in a TVprogram. The reader may get the impression that a story takes place while reading it.

During the summer of 1986 large Fanta bottles had one of three different comic strips with popular Disney characters printed on the back of the labels. Each story consisted of four pictures and traditional balloons (in two cases). Soft drink buyers were asked to ***complete each story*** by writing a text in the balloon(s) in the forth picture. The labels were sent to an advertising company. After a while some people were given T-shirts as gifts. However, the texts were not meant to be used for advertising. The texts should just end the stories. On request, all 2490 labels were donated to me for an analysis of the texts. The comic strips were grouped according to age groups and gender of the subjects. After this procedure names and addresses of the subjects were destroyed. All texts were then written into a computer system for subseqent analysis. The texts can be described as very simple. On average the LIX-value is 15.6. The total number of sentences is 4500 with an average of 6.4 words of four letters. On average only three percent of the words designating meaning are used more than ten times, and 91 percent are used less than five times. Thus the distribution of words with meaning is very similar to the average frequency of index words in the previous study "To index image contents" (table 2). There is no difference between the texts created by female or male subjects with respect to statistical measurements (table 5). The present work showed that *most subjects had their own ideas on how to finish the story* . Their imagination is great.

Table 5. Answers to the assignment: "Complete the story."

Variable	Donald		Mickey		Goofy	
	f	m	f	m	f	m
Number of subjects	469	403	520	393	418	287
Number of sentences	764	613	530	677	1173	743
Ave. numb. of words/sentence	5,9	6,1	6,6	6,4	6,3	6,8
Ave. word length	3,9	3,9	4,0	4,0	4,0	4,0
Numb. of diff. words carrying meaning	497	524	613	669	646	572
Occ. of the most common word	54	52	77	111	144	93
Frequency of words that are used in more than ten sentences (%)	3	2	2	3	6	4
Frequency of words that are used in less than five sentences (%)	91	94	94	92	88	89
LIX-value	12,0	12,5	15,4	16,0	18,6	19,1

f = female subjects, m = male subjects

To illustrate a story

It is interesting to study the pictures in different editions of fairy-tale books (or movies.) Different artists all have their individual styles of work. They also have their own ideas of what to select and how to emphasize interesting contents. It is an obvious fact that our perception of a story very much depends on the illustrations that are selected.

To produce informative materials

In one experiment (Hellspong et. al. 1987) five groups of students at the University of Stockholm were assigned the task of producing informative materials in three versions. One version was to be as "good" as possible, i.e. be "good" at transmitting information from senders to receivers. Another version was to be "poor." A third version was to be "neither good nor poor." In a second experiment seven groups of students produced one "good" and one "poor" version of informative materials. After production, senders as well as receivers assessed all the twentynine versions of information materials according to the 0-100 semantic differential scale. In both experiments results showed that there were major differences between intended and perceived levels of quality for the four examined variables "text", "visuals", "graphic design", and "total impression." The average level of intended quality was higher than the perceived levels, i.e. *the senders rated their materials more favorably than the receivers* (table 6). Perceived quality was better than intended quality only in about 15 percent of all 116 assessments.

Table 6. Results from assessments of "good" informative materials.

Variable	Intended value (senders)	Perceived value (receivers)	Difference
text	81	59	22
visuals	83	55	28
graphic design	75	61	14
total impression	84	59	26

n= mean assessments for 12 groups of students

Discussion

Verbal languages have digital codification with combinations of letters and/or numbers representing contents (Elkind, 1975). There is no direct correspondance between groups of letters, words, and reality. Each meaning is defined and must be learned. In contrast to this, non-verbal languages have analogic codification with combinations of basic graphical elements (dots, lines, areas and volumes) for likeness of a (concrete) reality (Pettersson, 1983 b.) Usually there is a correspondence with reality.Visuals are iconic. They normally resemble the thing they represent. Meaning is apparent on a basic level but must be learned for deeper understanding. Gombrich (1969) argues that no pictorial image gains the status of a "statement" unless an explicit reference is made to what it is supposed to represent. Barthes (1977) uses the term "anchorage" to describe the relationship of pictures to legends or other accompanying verbal language. Most pictures are capable of several interpretations until anchored to one by a caption.

The modern era of brain research began in the mid-1960's, when Dr. Roger Sperry and his associates published their findings regarding patients who were operated on to control life-threatening epileptic seizures (see Gazzaniga and Le Doux, 1978; Wilson, Reeves and Gazzaniga, 1982; and Sinatra, 1986, for reviews.) Several researchers have given a lot of thought to the function of the brain.

According to some theories, the two halves of the brain are apparently specialized and function independently of one another. At the same time, however, either of the brain halves appears to be capable of assuming the functions of the other half. There is an immense communication between the two halves. It has been estimated at six billion pulses per second.

Each half of the brain has its sensory perceptions, thoughts, feelings and memories. Thus the left half of the brain is said to be mainly verbal, capable of speech, counting and writing. It seems to be specialized in abstract thought, is analytical, logical and working linearly, detailed and sequential. It is controlled, dominant, critical, has established symbols processing, facile recognition, positive emoting, goal-oriented and developmental learning. It performs convergent search, is time sensitive, aggressive and controls the right half of the body. The right half of the brain is said to be speechless but capable of concrete thought, perception of space and an understanding of complicated relationships. It is said to be knowing without words, holistic, spatial, intuitive, creative, minor and self-knowing. It is receptive, able to work with new symbols, will remember new faces, new data and is negative emoting. The right half of the brain is artistic, interprets auditory signals, emotional undertones and music. It is said to be immediate knowing. It is working with divergent search and is time-abhorrent. It can count only to twenty, is only capable of reading simple nouns and is unable to write. The right half of the brain is said to be completely superior to the left half of the brain in its perception of both two- and three-dimensional images. The right half of the brain also controls the left half of the body.

Most certainly there is a lot of cooperation between the two brain hemispheres rather than competition. Dual processing modes of the hemispheres are beneficial to the human being. Blood flow mapping during reading aloud has shown that seven cortical regions are active in each of the hemispheres (Lassen et. al., 1978.)

According to Perfetti (1977) and Sinatra (1986) perception of linear representations, such as text, means a sequential, slow processing to compose and comprehend the content ("left brain activity".) Retrieval from verbal memory is a serial integration and sequential processing of auditory-motor perception systems (Sinatra, 1986.)

According to Gazzaniga (1967) and Sperry (1973, 1982) perception of two- or three-dimensional representations means a parallel simultaneous, holistic and fast processing ("right brain activity".) Lodding (1983) concluded that the image memory and processing capabilities of the human mind are extremely powerful. Pirozzolo and Rayner (1977) suggested that *word identification* is a multi-stage process. Visual-featural analysis is carried out by the right brain hemisphere. Word naming and word meaning are processed by the left hemisphere. According to Sinatra (1986) the meaning of well-known phrase units may be accomplished without activating the auditory-motor speech system. This is said to be done by rapid interchange of information between the language center in the left hemisphere and its non-verbal representation in the right hemisphere.

Several studies have shown that various "learning styles" exist (Duffy, 1983.) Among elementary school children in the US, 30 percent have been found to be "visual learners." 25 percent are "auditory learners," 15 percent "kinesthetic learners" and the remaining 30 percent have "mixed modalities". Visual learners learn basically from seeing, auditory learners from hearing and kinesthetic and/or tactual learners learn by actually doing things. Those with mixed modality learn from all kinds of sensory impressions. A verbal response to visual stimuli or a visual response to verbal stimuli requires a transformation from one modality to another. Research concerning the effects of verbal as well as visual modalities shows that children pay more attention to visual than to verbal information. Zuckerman et. al. (1978) found that children tend to be more accurate in recognizing visual than auditory segments in television commercials. Hayes and Birnbaum (1980) showed preschool children cartoons in which the audio track either matched or mismatched the visual information. In both cases kids had a higher retention of the visual than of the auditory information. Pezdek and Stevens (1984) found that when children had to choose which of two incompatible channels to process they preferred the video channel. The auditory information sustains attention and facilitates comprehension. Pezdek and Hartman (1983) found that video without sound reduced comprehension among preschool children. Rolandelli et. al. (1985) concluded that children used the auditory component of television to direct attention to important visual information, as well as to process auditory, especially verbal content.

The subjects taking part in the studies discussed in this paper were not tested for modalities nor for learning styles. However, there is no reason to assume that the proportions of modalities should be different between the various groups of subjects. Most likely the groups are similar in these respects. There are many approaches to picture perception. Based on the theory of linear perspective, invented during the Renaissance, Gibson (1971) defined picture perception as *a stimulus-driven process* in which information is picked up from optical array. The opposite view is held by Gombrich (1969) and Gregory (1978.) While seeing a picture *the viewer constructs a meaning* based on experience and expectations. From this receptionist position neither the readers or the message remains the same. Meaning exists only for a moment within each individual reader. Another approach to picture perception is based on semiotics and symbol theory (Goodman, 1976.) Intentionalism suggests that meaning is embedded in the message by a producer, leaving the reader to discover and unfold it. From this perspective meaning exists independent from the reader. For an intentionalist a painting means what the artist says it does. For a receptionist the painting does not mean anything until the reader says it does (Muffoletto, 1987.) Boeckman (1987) makes a clear distinction between drawings and paintings, which have "signs" and photographs which have "recorded perceptional stimuli." "Before photography was invented there were two modes to learn about reality. Perception processing stimuli of the surrounding reality on the one hand and communication processing signs on the other. Now we have something in between: Recorded perception stimuli which are not reality but not signs either". And for Arnheim (1974) picture perception is a matter of responding to basic forms such as gestalt laws. An important point of Arnheim's is that visual perception includes the same behaviors that we commonly consider only as matters of cognition or thinking. A "percept" is a building block of visual thinking and as such analogous to the cognitive function of a concept.

The perception process is often assumed to consist of two stages. A fast overview is followed by a consious analysis. When we first look at an image we only see that which is necessary to perceive and identify objects and events in a reasonable and meaningful manner. This is Gibson's "principle of economy" (Gibson, 1966.) Results from the experiments presented in this paper confirm this ***dual stage perception.*** Simple line drawings accompanied by various assignments caused very different reactions in subjects. It is obvious that the different assignments have caused perception and image interpretation on ***different cognitive levels.*** It may be suggested that image interpretation on low cognitive levels follows these steps:

1. The subject looks at the image. A few rapid eye fixations are made.
2. The information is handled as a "whole" in parallel, simultaneous, tentative, rough, holistic and fast processing.
3. A "wholeness interpretation" occurs, recognition and meaning of the image content is formed very quickly - "immediately."
4. This interpretation is expressed by the use of a very limited number of words.

It may also be suggested that image interpretation on high cognitive levels follows these steps:

1. The subject looks at the image. A few rapid eye fixations are made.
2. The information is handled as a "whole" in parallel, simultaneous, tentative, rough, holistic and fast processing.
3. A "wholeness interpretation" occurs, recognition and meaning of the image content is formed very quickly - "immediately."
4. Certain details in the image attract more eye fixations.
5. The information is processed again, maybe several times, detail by detail.The process demands attention and is sequential.
6. Our verbal memory is activated in a search for suitable expressions. Various hypotheses about the image content are weighed against one another and tested. Segmented codes have to pass through several levels of recognition and interpretations before meaning occurs.
7. The interpretation of the image contents is expressed by the use of a large number of different words.

In both cases, I believe, both halves of the brain are involved in the interpretation of image contents (figure 5.) In the first case there might be a dominance of right brain activity. However, in the other case there might be a dominance of left brain activity. Interpretation of verbo-visual information such as a television-program is likely to take place simultaneously in both parts of the brain. *How we actually create meaning is an area where much research still is needed.*

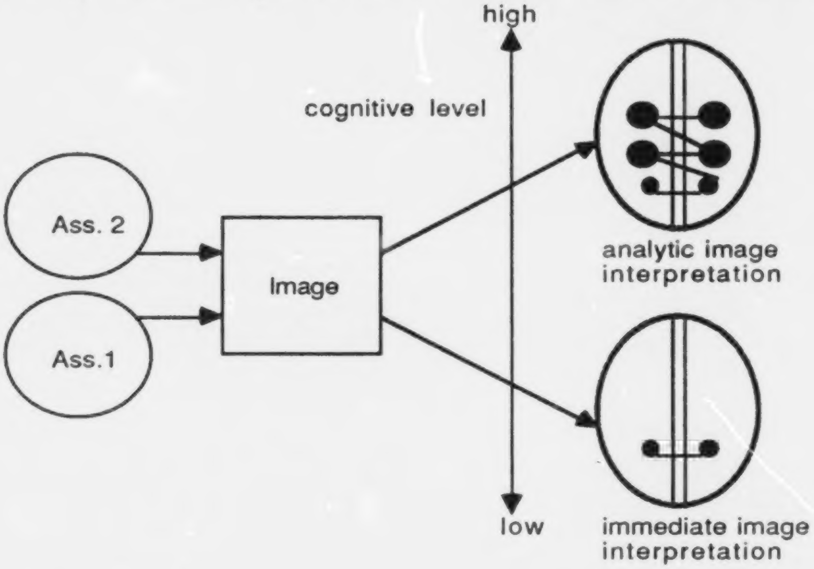


Figure 5. An image is interpreted in different ways depending on the assignment.

Conclusions

- Perceived image content is different from intended image contents.
- Different assignments may cause different interpretations of image contents.
- Some assignments cause interpretation of image contents on a low cognitive level.
- Some assignments cause interpretation of image contents on a high cognitive level.
- Even simple pictures may cause many different associations.
- A given set of basic elements can be combined to form completely different images.
- The design of a picture can be changed a great deal without any major impact on the perception of the image contents.
- Content is more important than execution.
- Picture readability is positively correlated with both aesthetic ratings and assessed usefulness in teaching.
- Legends should be written with great care. They heavily influence our interpretation of image content.
- To a large degree readers see what they are told to see in an image.
- Content is more important than format.
- There seem to be no major difference between gender in interpretation of image contents.
- Most subjects have their own ideas on how to finish a story.
- There are major differences between intended and perceived levels of quality in informative materials.
- Computer-based indexing systems should rely on full text image descriptions.
- *How we actually create meaning is an area where much research still is needed.*

References

Arnheim, R. 1974: *Art and visual perception: A psychology of the creative eye* (rev.ed.), Berkerly, CA: University of California Press.

Barthes, R. 1977: *The rhetoric of the image.* In Image, music, text, essays translated by S. Heath, London: Fontana.

Boeckman, K. 1987: *The Sign Structure of Realistic Images.* Paper presented at the Symposium on Verbo-Visual Literacy: Research and Theory. Stockholm, June 10-13.

Duffy, B. (Ed.) 1983: *One of a kind. A practical guide to learning styles 7-12.* Oklahoma State Department of Education.

Dwyer, F.M. 1978: *Strategies for improving visual learning.* State College. PA:Learning Services

Ek, G. & Frederiksen, M. 1986: *Utformning av histogram.* Undergraduate thesis, Department of Computer Science, University of Stockholm.

Elkind, D. 1975: *We can teach reading better.* Today's Education. No. 64. p.34-38.

Gazzaniga, M. 1967: *The split brain in man.* Scientific American. No. 217, p. 24-29.

Gazzaniga, M.S., and Le Doux, J. 1978: *The integrated Mind.* New York, Plenum Press.

Gibson, J.J. 1966. *The senses considered as perceptual systems.* Boston: Hougton-Mifflin.

Gibson, J.J. 1971: *The information available in pictures.* Leonardo, 4, 27 - 35

Gombrich, E.H. 1969: *Art and illusion: A study in the psychology of pictorial representation*. Princeton, N.J.: Princeton University Press

Goodman, N. 1976: *Languages of Art: An approch to a theory of symbols* (2nd ed.) Indianapolis. IN: Hacket Publishing.

Gregory, R. L. 1978: *Eye and brain* (3rd ed.). New York: McGraw-Hill

Hayes, D.S. & Birnbaum, D.W. 1980: *Preschoolers' retention of televised events: is a picture worth a thousand words?* Development Psychology, Vol. 16 No. 5. p. 410-416

Hellspong, L., Melin, L., Pettersson, R. and Propper, G. 1987: *Intended and perceived content in informative materials*. Paper presented at the Symposium on Verbo-Visual Literacy: Research and Theory. Stockholm, June 10-13.

Lassen, N., Ingvar, D., and Skinhöj, E. 1978: *Brain function and blood flow*. Scientific American, 239:62-72.

Limburg, V.E. 1987: *Visual "Intrusion": A two-way street in Visual Literacy*. Paper presented at the Symposium on Verbo-Visual Literacy: Research and Theory. Stockholm, June 10-13.

Lodding, K. 1983: *Iconic Interfacing*. Computer Graphics and Applications. Vol.3. No. 2. p. 11-20.

Muffoletto, R. 1987: *Critical Viewing - Critical Thinking: Reading The Visual Text*. Paper presented at the Symposium on Verbo-Visual Literacy: Research and Theory. Stockholm, June 10-13.

Paivio, A. 1979: *Imagery and Verbal Processes*. Hillsdale, New Jersey, Lawrence Erlbaum Associates, 1980.

Paivio, A. 1983: *The empirical case for dual coding*. In Yuille, J.C. *Imagery, memory and cognition* (pp.307-332). Hillsdale, NJ: Erlbaum

Perfetti, C. 1977: *Language comprehension and fast decoding: Some psycholinguistic prerequisites for skilled reading comprehension*. In Guthrie, J. (Ed.) 1977: *Cognition, Curriculum, and Comprehension*. Newark, Delaware, International Reading Association.

Pettersson, R. 1983a: *Fcctors in visual language: Image framing*. Visual Literacy Newsletter. Vol. 12. Nos. 9 and 10.

Pettersson, R. 1983b: *Visuals for Instruction*. Stockholm University: CLEA no. 12.

Pettersson, R. 1984: *Picture legibililty, readability and reading value*. In Walker, A.D., Braden, R.A. & Dunker, L.H. Enhancing human potential. Readings from the 15th Annual Conference of the International Visual Literacy Association. Blacksburg, Virginia. pp. 92-108.

Pettersson, R. 1985: *Intended and Perceived Image Content*. The 17th Annual Conference of the International Visual Literacy Association. Claremont. CA. Nov. 1-2.

Pettersson, R. 1986a: *Picture Archives*. EP Journal. June 1986, p. 2-3.

Pettersson, R. 1986b: *Image - Word - Image*. Presentation at the 18th Annual Conference of the International Visual Literacy Association. Madison, Wisconsin, Oct.30 - Nov. 2.

Pettersson, R. 1986c: *See, look and read*. Journal of Visual Verbal Languaging. Spring 1986. p. 33-39.

Pettersson, R. 1986d: *Properties of pixels*. EP Journal. December 1986, p.2-4.

Pettersson, R. 1987: *Linguistic Combinations*. Symposium on Verbo Visual Literacy: Research and Theory. Stockholm, June 10-13.

Pezdek, K. & Hartmann, E.P. 1983: *Children's television viewing: attention and comprehension of auditory versus visual information*. Child Development, 51, p. 720-729.

Pezdek, K. & Stevens, E. 1984: *Children's memory for auditory and visual information on television*. Developmental Psychology. Vol. 20. No. 1. p. 212-218.

Pirozzolo, F. & Rayner, K. 1979: *Cerebral organization and reading disability*. Neuropsychologia, 17, p.485-491.

Potter, M.C. & Levy, E.I. 1969: *Recognition memory for a rapid sequence of pictures*. Journal of Experimental Psychology 81, pp. 10-15.

Rolandelli, D.R., Wright, J.C. & Huston, A.C. 1985: *Children's auditory and visual processing of narrated and non-narrated television programming*. Paper presented at the Annual Meeting of the International Communication Association (35th, Honolulu HI, May 1985)

Sinatra, R. 1986: *Visual Literacy Connections to Thinking, Reading and Writing*. Springfield. Illinois, Charles C. Thomas.

Sperry, R. 1973: *Lateral specialization of cerebral functions in the surgically separated hemispheres*. In McGuigan, F.J., and Schoonever, R.A., (Eds.) 1973: *The Psychophysiology of Thinking: Studies of Covert Processes*. New York, Academic Press.

Sperry, R. 1982: *Some effects of disconnecting the hemisphere*. Science no. 217. p. 1223-1226.

Sperry, R. W. 1973: *Lateral specialization of cerebral function in the surgically separated hemispheres*. in McGuigan, F. J. & Schoonorer, R.A. (ed.), *The Psychophysiology of thinking*. Academic Press.

Vogel, D.R., Dickson, G.W. and Lehman, J.A. 1986: *Driving the Audience Action Response*. Computer Graphics World. August 1986.

Wilson, D.A., Reeves, A., and Gazzaniga, M.S. 1982: *"Central" commisurotomy for intractable generalized epilepsy: Series two*. Neurology, 32:687-697.

Zuckerman, M., Zeigler, M. & Stevenson, H.V. 1978: *Children's viewing of television and recognition of commercials*. Child Development. No. 49 p.96-104.

A Comparision of Learning Styles of Academic and Vocational Male and Female Students

Beverlee Kissick and Don H. Grob

Introduction:

Research gives evidence that people do not all learn in the same way. Teaching students through their distinctive and individual learning style can improve their achievement. Learning style inventories can help define each student´s characteristic learning style or preference and suggest suitable accommodation for that style (Lemmon, 1985).

Keefe (1979) states: "Learning style diagnosis opens the door to placing individualized instruction on a more rational basis. It gives the most powerful leverage yet available to educators to analyze, motivate, and assist students in school, as such, it is the foundation of a truly modern approach to education" (p. 131).

"Learning style describes a student in terms of those educational conditions under which he is most likely to learn. To say that a student differs in learning style means that certain educational approaches are more effective than others for him" (Davidman, 1981, p. 642).

Problem:

The focus of the study is to investigate the learning styles of female and male academic and vocational students. Two questions were posed at the beginning of the investigation.

1. Do academic and vocational students differ in their preferred learning styles?

* Portions of this paper have been accepted for publication by the International Journal of Instructional Media.

2. Do male and female students differ in their preferred learning styles?

Participants:

Participants for the study consisted of 52 vocational students (9 female and 43 male) from Salina Area Vocational Technical School, Salina, Kansas, and 53 academic students (38 female and 15 male) from Virginia Commonwealth University, Richmond, Virginia. Students from the vocational technical school were studying welding, printing, drafting and electronics. The majority of the academic students were pursuing careers in education and mass communications. Administration of the Learning Styles Inventory occurred during the 1986 fall semester.

Instrument:

A self-report learning style inventory, developed at the Murdock Teacher Center, Wichita, Kansas, was the instrument used in the study. It consists of 45 statements related to nine learning style categories under the three major divisions of cognitive style, social style, and expressive style. Students were provided a choice of four responses ranging from "least like me" to "most like me" on a Likert-type questionnaire.

Data Analysis:

A two by two factorial design was developed. One factor represented sex (female, male) and the other factor represented school (vocational, academic). Nine two-way analyses of variance were calculated in order to determine whether there was a significant difference at the .05 level between vocational and academic students and between female and male students in relation to each of the nine learning style variables. Cell means of the nine learning style variables were generated for the four populations (See Table 1).

The cognitive learning style section is divided into five classes of preferred methods of attaining information. They are (1) auditory language, (2) visual language, (3) auditory numeric, (4) visual numeric and (5) tactile concrete.

Auditory language learning style refers to students who learn best by verbal instruction. Students who prefer this style of learning are more capable of understanding and retaibbbning facts learned by hearing. A significant finding of the auditory language variable indicates that academic and vocational females prefer auditory language as a learning

Table 1

Means of 9 Learning Style Dependent Variables by School and Gender

		School	Academic		Vocational	
		Gender	M	F	M	F
COGNITIVE LEARNING STYLES	Auditory Language		23.47	27.68	26.56	30.44
	Visual Language		27.07	25.68	24.28	22.44
	Auditory Numerical		25.60	26.26	27.12	26.89
	Visual Numerical		34.93	35.21	30.98	34.89
	Tactile Concrete		28.00	31.32	30.74	33.11
SOCIAL LEARNING STYLES	Individual Learning		33.60	32.11	28.14	29.11
	Group Learner		26.13	28.16	28.42	30.67
EXPRESSIVE LEARNING STYLES	Oral Expressive		27.73	29.16	28.65	24.44
	Written Expressive		27.47	30.53	25.86	30.44
		Number	15	38	43	9

style more than academic and vocational males (See Table 3).

Visual language learning style refers to students who learn best by seeing words on paper. They remember and use information better if they read it. There were no significant findings (See Table 3). Auditory numerical learning style relates to students who learn best by hearing numbers and oral explanations of numbers. They can easily work problems in their heads. There were no significant findings (See Table 3).

Visual numerical learning style pertains to students who learn best by seeing numbers on paper. These students are more likely to remember math facts if they have seen them. They do not need as much oral explanation. A significant finding of the visual numerical variable indicate that academic females and males favor visual numerical as a learning style more than vocational males and females (See Table 3).

Tactile concrete learning style refers to students who learn best by experience and a combination of stimuli. These students need manipulation of material along with sight and sound. A significant finding of the tactile concrete variable suggest academic and vocational females favor tactile concrete as a learning style more than academic and vocational males (See Table 3).

Social style refers to learner preference of working in a group or alone. This section is divided into two classes, individual learner and group learner.

An individual learning style refers to students who learn best by working alone. They think best and remember more when they work by themselves. A significant finding on the individual learning variable implies academic males and females prefer individual learning as a learning style more than vocational males and females (See Table 3).

A group learner style refers to students who learn best when studying with at least one other person. Group interaction increases their learning. There were no significant findings (See Table 3).

Expressive style refers to the preferred method of giving out information. This section is divided into two classes, oral expressive and written expressive.

An oral expressive learning style refers to students who prefer to verbalize what they know. They talk fluently and comfortably. For oral expressive, the School by Sex

Table 3

Results of ANOVA's for Nine Dependent Variables

Dependent Variable - Auditory Language (Cognitive Learning Style)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
School	14.381	1	14.381	0.369	0.545
Sex	303.223	1	303.223	7.779	0.006 *
School x Sex	0.483	1	0.483	0.012	0.912
Residual	3936.771	101	38.978		

Dependent Variable - Visual Language (Cognitive Learning Style)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
School	117.293	1	117.293	2.038	0.157
Sex	44.705	1	44.705	0.777	0.380
School x Sex	0.899	1	0.899	0.016	0.901
Residual	5814.017	101	57.565		

Dependent Variable - Auditory Numerical (Cognitive Learning Style)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
School	26.324	1	26.324	0.864	0.355
Sex	1.626	1	1.626	0.053	0.818
School x Sex	3.488	1	3.488	0.114	0.736
Residual	3078.276	101	30.478		

* = Significant at .05 level

BEST COPY AVAILABLE

Table 3 (Continued)

Results of ANOVA's for Nine Dependent Variables

Dependent Variable - Visual Numerical (Cognitive Learning Style)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
School	317.546	1	317.546	10.050	0.002 *
Sex	56.613	1	56.613	1.792	0.184
School x Sex	58.117	1	58.117	1.839	0.178
Residual	3191.115	101	31.595		

Dependent Variable - Tactile Concrete (Cognitive Learning Style)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
School	15.826	1	15.826	0.547	0.461
Sex	155.976	1	155.976	5.389	0.022 *
School x Sex	3.960	1	3.960	0.137	0.172
Residual	2923.285	101	28.943		

Dependent Variable - Individual Learner (Social Learning Style)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
School	467.563	1	467.563	10.381	0.002 *
Sex	4.299	1	4.299	0.095	0.758
School x Sex	26.755	1	26.755	0.594	0.443
Residual	4549.231	101	45.042		

* = Significant at .05 level

261 262

Table 3 (Continued)

Results of ANOVA's for Nine Dependent Variables

Dependent Variable - Group Learning (Social Learning Style)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
School	39.246	1	39.246	1.292	0.258
Sex	81.474	1	81.474	2.683	0.105
School x Sex	0.220	1	0.220	0.007	0.932
Residual	3067.251	101	30.369		

Dependent Variable - Oral Expressive (Expressive Learning Style)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
School	18.154	1	18.154	0.427	0.515
Sex	14.045	1	14.045	0.330	0.567
School x Sex	139.483	1	139.483	3.279	0.073
Residual	4295.976	101	42.534		

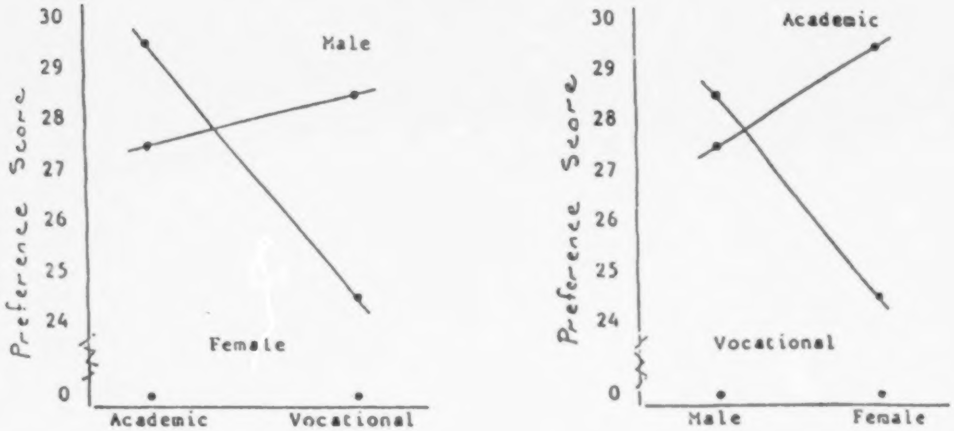
Dependent Variable - Written Expressive (Expressive Learning Style)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
School	237.258	1	237.258	7.464	0.007 *
Sex	246.844	1	246.844	7.765	0.006 *
School x Sex	10.220	1	10.220	0.322	0.572
Residual	3210.592	101	31.788		

* = significant at .05 level

interaction was significant at the 7% level (although not at the 5% level), indicating that the differences between means for the academic and vocational groups were not consistent for males and females. This is a possible reason for the non-significance indicated in the ANOVA table for the difference in the overall means of males vs females and for the difference in the overall means of academic vs vocational groups (See Table 3). For females, academic students showed more preference for oral expressive than vocational students. This can be seen graphically:

Table 2



A written expressive learning style refers to students who prefer to write what they know. Their thinking is better organized on paper than when presented orally. There were two significant findings involving school and sex. Academic males and females prefer written expressive as a learning style over vocational males and females and academic and vocational females prefer written expressive as a learning style over males (See Table 3).

Summary:

This investigation suggests there are significant differences in learning styles of academic and vocational students and male and female students. The results indicate academic and vocational females prefer to learn by hearing words spoken (auditory language) more than academic and vocational males. Academic females and males understand mathematical information better if they see it on paper (visual numerical) more than vocational males and females. Vocational and academic females prefer "hands-on" experiences with additional visuals and sounds (tactile-concrete) more than vocational and academic males. Academic males and females think better and remember more when working alone (individual learner) than vocational males and females. Academic males and females and vocational females prefer to express themselves through writing (written expressive) more than vocational males.

The results of this study could be used as a basis for reevaluating "how we teach" in vocational and academic schools. Educators could use the findings as criteria to accommodate the learning styles of their students.

References

Davidman, L. (1981). Learning style: The myth, the panacea, the wisdom. Phi Delta Kappan, 62, 641-645.

Keefe, J. W. (1979). Student Learning Styles: Diagnosing and Prescribing Programs. Reston, Virginia: National Association of Secondary School Principals.

Lemon, P. (1985). A school where learning styles make a difference. Principal, 64, 26-28.

The Effects of Presentation Order and Contextual Background on Cognitive Style

David M. Moore

This study tested the effects of cognitive style (field dependent/field independent) upon the short term recall of abstract figures seen with different contextual backgrounds. The study further investigated the possibility that one background could be used as a model for recalling abstract figures within another background.

The early developmental research and theory concerning field dependence/independence was conducted by Witkin and his associates (Witkin & Goodenough, 1981). Field independency/ dependency tends to appear on a continuum. However, field independent individuals tend to give structure to unstructured visual material and tend to separate an individual item or component from its overall context. Field dependent individuals, on the other hand, tend to respond holistically to stimuli (Witkin, et. al., 1977). While many studies have dealt with the interaction of the medium of presentation and the characteristics of the learner, there has been few attempts to use visual organizing devices, deliberately developed and of a particular cognitive style (Moore & Bedient, 1986). Instructional designers have not considered completely the implications of such design factors such as dealing with the complexity of background and presentation order.

In his research, Witkin (1977) noted that certain individuals relied heavily on the outside environment for perceptual cues even as they conflicted with internal ones. Others were able to separate easily essential information from a surrounding visual field. The two orientations, titled field dependence and independence, respectively, exist on a continuum, with individuals found at all points. Field dependent individuals tend not to add structure to visuals and accept the visual as presented. They tend to fuse all segments of a visual field (e.g. a picture) and do not view the visual's components discretely.

Field dependent and independent individuals approach learning in different ways. Goodenough (1976) and Witkin, Moore, Goodenough, and Cox (1977) have reviewed the literature and offered several conclusions about learning and cognitive style. First, field independent individuals, being more analytic in approach, tend to act upon a stimulus complex, analyzing it when it is organized, structuring it when it lacks organization. In many instructional situations, the ability to analyze and structure aids in learning. The field dependent learner, however, takes a more passive approach, accepting the field as given, experiencing it in a more global, diffuse manner. This passive approach means that field dependent individuals tend to notice those cues in a stimulus field which stand out or are more salient. When the stimulus is arranged so that the salient cues are also relevant, then the field dependent person may experience little difficulty. In fact, if a learning task is clear, well-structured, and low in complexity, then there may be no significant differences in learning by the two orientations. However, in situations where cue relevance and saliency are in conflict, the performance of field dependent individuals seems to suffer. The field independent person who samples more fully from cues, both salient and non-salient, performs more successfully. Increasing salience by manipulating instructional material should tend to make the field dependent learner sample more fully from all cues, thus modifying his or her visual strategy. It is hypothesized that a visual with a background with certain relevant (contextual) cues would be of value to field dependent individuals in recalling information about figures appearing in the picture or visual. Compared to field independent persons, field dependent individuals have a greater need for and are more dependent on external sources of structure (background) and organization. Information recall from visuals for field dependent individuals is facilitated if major visual cues are made relevant and is hindered if important appearing cues are irrelevant or not noticeable. Field independent persons, however, tend to be able to receive information from both relevant and irrelevant cues. It is further hypothesized that if field dependent individuals are shown a procedure (modeling) in which they view figures within a background containing important and useful cues in terms of number, shape and location, they will be able on subsequent viewing of pictures or visuals without these relevant contextual cues, transfer the context to these types of pictures. Because of the ability of field independent persons to create structure and not to be dependent upon external cues, they should not be affected by either treatment (presentation or order). Field independent individuals should score higher than field dependent individuals on any visual recall test. If information can be identified which supports the concept that for certain types of cognitive styles, certain visual formats are effective, then instructional designers would be able to design appropriate visual materials (Whitley & Moore, 1979).

Subjects

The subjects for this experiment were 96 undergraduate college students (72 female, 24 male) enrolled in professional education courses. These subjects were classified as field dependent or field independent by means of the Group Embedded Figures Test (GEFT) (Witkin, et al, 1977). Because the test manual sets no guidelines for interpretation, the subjects were arbitrarily assigned into the above categories by means of a median split. In this case scores of 14 and above were classified as field independent, and those with scores of 13 and below were classified as field dependent.

Procedure

Subjects viewed two separate treatments containing abstract figures after which they were requested to (1) draw the outline of an abstract figure, (2) note the number of components in this figure and (3) note the location(s) of the figure in a partitioned grid. The abstract figures were developed from large "filled in" dots and consisted of four to seven of the "dots" or components. Treatment one (T1) used contextual cues of outlined dots in the background of the abstract figure. (See figure 1.) Treatment two (T2) used only the dots making up the abstract figure. (See figure 2.) For each treatment, there were 15 individual pictures. Subjects responded on a special answer sheet (see figure 3) after viewing an individual slide for five seconds. The subjects then had five seconds to respond. Each figure had the value of seven points (one for the correct number of figure parts, three for the correct grid placement and three for the correct figure shape). Each treatment had a total of 105 (15 x 7) possible points. The stimulus materials were photographed and made into slides with a blue background. A slide projector with an automatic timed advance was used to project the individual slides. A blank slide was inserted between the individual stimulus slides. After the subjects were classified as field dependent or field independent, they were randomly assigned to group one or two. Group one saw treatment one (background with cues) first and treatment two (background without cues) second. Group two viewed treatment two (background without cues) first, followed by viewing treatment one (background with cues). Thus, a subject could receive a score of (0-105) for each treatment. All testing conditions were held under the same conditions. For this experiment, there were three independent variables: cognitive style (field dependent,

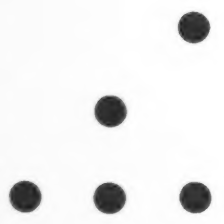


Figure 1

"Without Cues"
Background

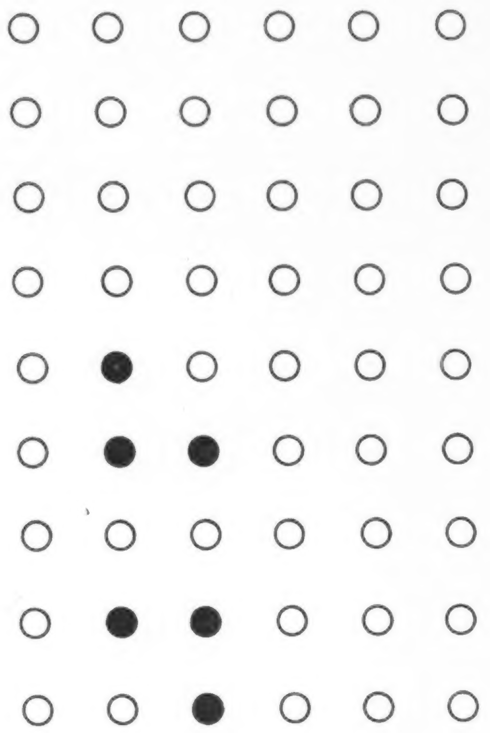


Figure 2

"With Cues"
Background

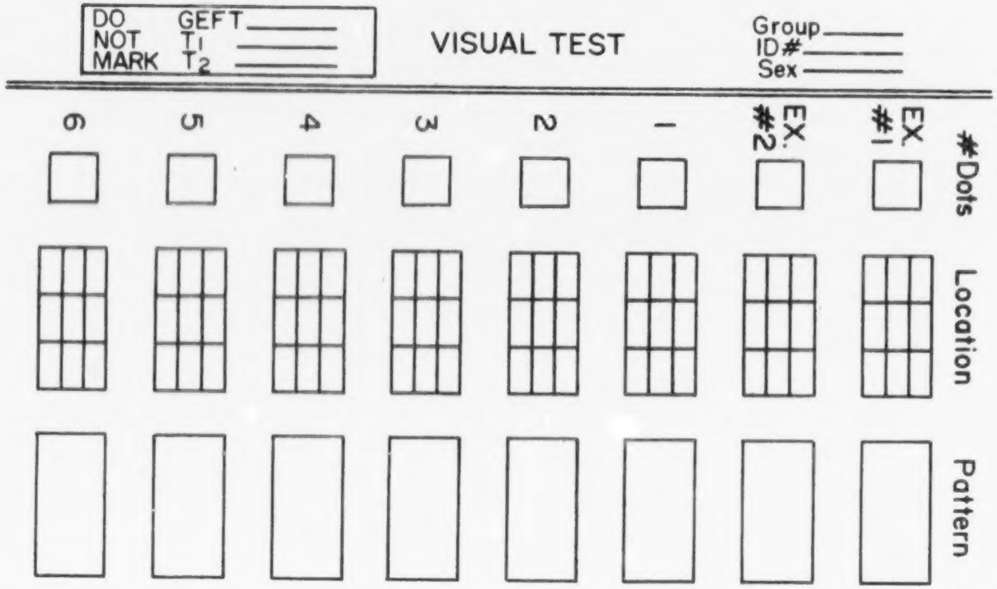

DO NOT MARK
GEFT
T1
T2
VISUAL TEST
Group
ID#
Sex
#Dots
Location
Pattern
EX. #1
EX. #2
1
2
3
4
5
6

Figure 3

field independent); order of presentation (T1 and T2 or T2 and T1) and background mode (with cues, without cues). The dependent variables were the two scores received on treatment one and treatment two on the recall of visual information test. A three-way analysis of variance was used to test the following hypotheses: did (1) background modes, (2) order of presentation (3) cognitive style or (4) interaction of any of the main effects affect scores on a test of immediate recall of visual information?

Results

A three-dimensional statistical (2x2x2) design, a split-plot design using repeated measures was employed (Kirk, 1968). The summary table of the analysis of variance based upon the table of means (Table 1) is presented in Table 2. To allow for equal cell distribution six subjects were randomly discarded from the appropriate cells. Thus a total of 96 subjects was used in this analysis. The F ratio for cognitive style F (1,23) = 25.954, $p < .001$ was significant. However, no significance was found for background mode F (1,23) = .050, $p > .05$ or order of presentation F (1,23) = 1.381, $p > .05$. Also there was no interaction between cognitive style and background mode F (1,23) = .490, $p > .05$, or between cognitive style and order of presentation F (1,23) = 1.194, $p > .05$ or between cognitive style, background mode and order of presentation F (1,23) = .259, $p > .05$. There was, however, significant interaction between background mode and order of presentation F (1,23) = 5.803, $p < .05$. Figure 4 illustrates this interaction. From this graph of interaction it can be seen that

1. the most effective treatment order is showing treatment with background cues first then treatment without cues;
2. the second treatment no matter what order was more effective than the first treatment.

Discussion

Because the characteristics of field independent/dependent individuals are well documented by Witkin and Goodenough (1982), it was expected that field independent subjects would score significantly higher on a visual recall test than field dependent subjects.

Davis and Frank (1979) suggest that field independent learners possess memory efficiency superior to field dependent individuals, and also possess the ability to perform combinatorial analyses, defined as the ability to "systematically generate all possible combinations and

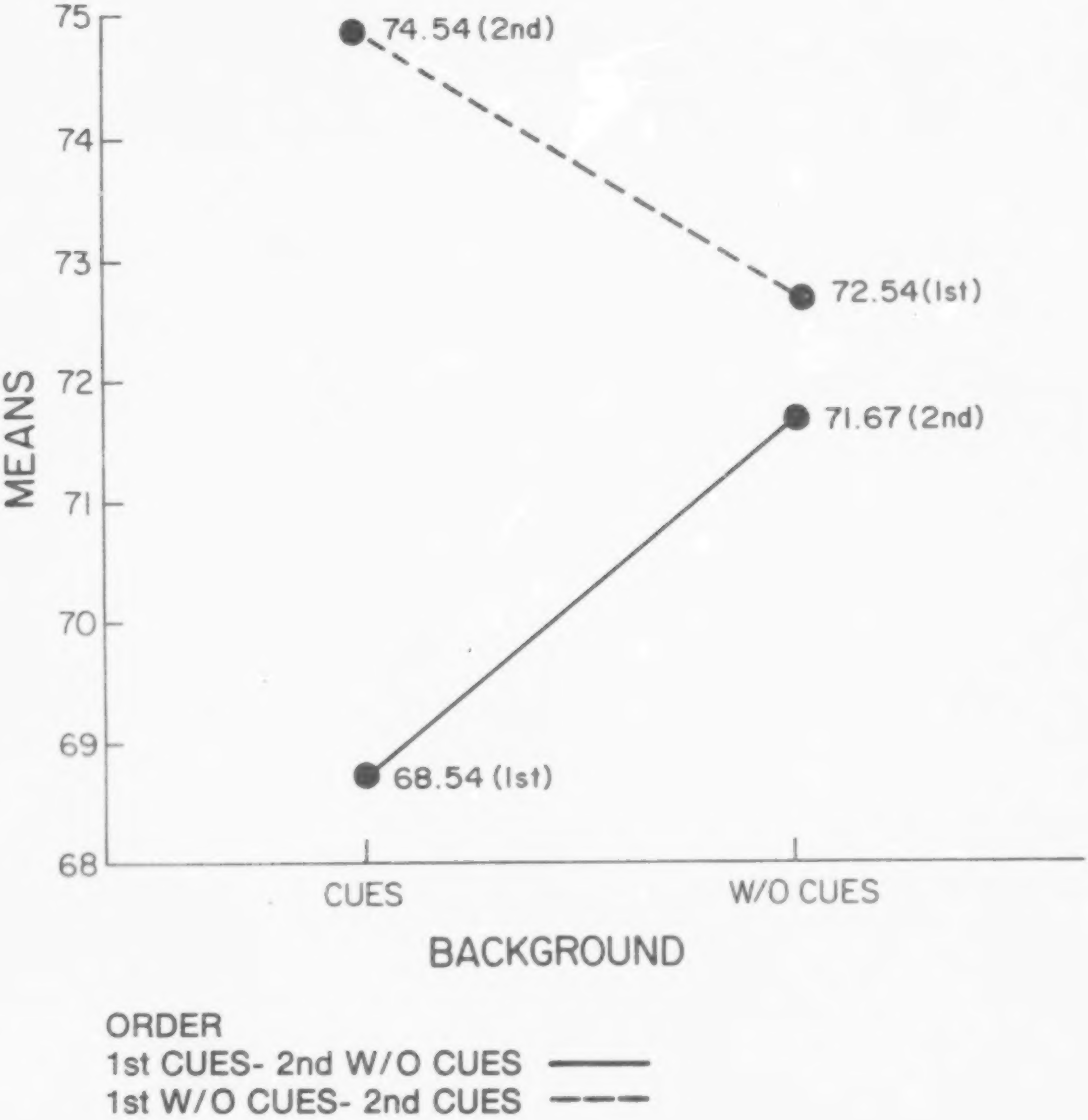


FIGURE 4 INTERACTION OF BACKGROUND MODE AND ORDER OF PRESENTATION

Table 1
Table of Means

	Background w/cues 71.54 (12.71)		Background without cues 71.85 (11.57)	
	ORDER		ORDER	
	1st	2nd	1st	2nd
Field Dependent 67.63 (12.21)	64.38 (9.87)	71.79 (14.30)	66.33 (10.38)	68.00 (14.34)
Field Independent 75.77 (12.05)	72.71 (13.53)	77.29 (13.14)	78.75 (8.11)	74.33 (13.43)
	68.55 (11.7)	74.54 (13.72)	72.54 (9.25)	71.67 (13.89)

(   )   Standard Deviation

Table 2
Summary Table ANOVA
Repeated measure split plot design

SOURCE	SS	DF	MS	F	P
BLOCKS/SUBJECTS	5357.978	23			
A (Cognitive Style)	3185.021	1	3185.021	25.954	<.001**
ERROR	2822.479	23	122.716		
B (Background)	4.688	1	4.688	.050	
ERROR	2141.813	23	93.122		
A X B	72.520	1	72.520	.490	
ERROR	3404.964	23	148.042		
C Order of Presentation	256.688	1	256.688	1.381	.250
ERROR	273.813	23	185.818		
A X C	238.520	1	238.520	1.194	.285
ERROR	4592.972	23	199.694		
B X C	652.687	1	652.687	5.803	.023***
ERROR	2586.809	23	112.470		
A X B X C	31.689	1	31.689	.259	
ERROR	2811.838	23	122.254		
TOTAL	32434.478	191			
RESIDUAL	22634.688	161			

**p<.001 ***p<.05

permutations of a set of elements" (Flavell, 1977, cited in Davis & Frank, 1979). Witkin, et al. (1962) also discovered memory deficiencies in field dependent youngsters, and concluded that they were a result of the lack of registration of material due to poor structuring, or in Witkin's words, "susceptibility to retroactive inhibition on intrinsically unorganized material" (1962, p. 99). The results of this study reconfirmed this expectation. This finding should strengthen the premise that there are indeed, individuals who have the characteristics as described by Witkin and that the Group Embedded Figures Test does identify those persons with these characteristics (Moore, 1985).

It was hypothesized in this study that a background containing contextual cues would aid individuals identified as field dependent on this particular visual recall task. As noted earlier, this did not happen. If field dependent persons learn more efficiently under low information loads, the tendency might be to simplify material by leaving out certain cues, in particular when designing instructional visuals. This technique has not proved especially successful. As Dwyer relates "One possible solution to increase the effectiveness of visualization is to limit or reduce the amount of information presented by the visual... the process of reducing detail may also unintentionally eliminate detail which would have been considered as primary learning cues for some learners" (1978, pp. 157-158). The results of two studies using compressed visuals (Dickie, 1969; Hessler, 1972) indicate that compression does seem to aid field dependent individuals somewhat, but it appears to be more advantageous to field independent individuals.

One reason for the above results may be that the literature on field dependence indicates that an essential feature of disembedding is the presence of an organized field to be broken up. When the field is a pattern or some other unorganized features merely serving as distraction, then a different factor is involved (Karp, 1963; Witkin, Moore, Goodenough, & Cox, 1977).

There was a significant interaction between presentation order and background mode. When there is an interaction, the magnitude and direction of one main effect depends upon the level of the other main effect. Because of this interaction it became necessary to interpret the main effects by examining comparison between main effects at a specific level, e.g., the simple main effects by means of a one way analysis of variance. It was earlier hypothesized if field dependent individuals after viewing a visual with relevant cues in a background and later viewed another visual without these background cues then might be able to transfer these cues to the second visual. The F-ratio comparing field dependents viewing the treatment with cues and the treatment without cues indicates that there was a significant difference ($F(1,46) = 4.37$, $p < .05$) in these means. Field dependents were able to transfer cues from one visual to the second (without cues). The one way analysis was also used to test if this held true for field independent individuals as well. The F-ratio indicated no significant difference $F(1,146) = 1.42$, $p > .05$. Likewise, there was no significant differences in means for either field dependent individuals ($F(1,146) = .21$, $p > .05$) or field independent individuals ($F(1,146) = 1.90$, $p > .05$) when viewing visuals without cues followed by viewing visuals with cues.

Thus, for field dependent individuals there appears to be a "modeling effect" taking place. Field dependent individuals actually learned cues which helped them when shown visuals without cues. This effect did not take place for field independent subjects (mean scores were also higher for the second visuals shown with cues, but not significantly). This finding that field dependent individuals can learn and transfer visual information should be important for developers of visual instructions and be a basis for additional research.

References

Davis, J. K. & Frank, B. M. (1979). Learning and memory of field dependent-independent individuals. *Journal of Research Personality*, *13*, 469-479.

Dickie, K. E. (1969). Effects of compressing visual information and field dependence on acquiring a procedural skill (Doctoral Dissertation, Indiana University). University Microfilms No. 70-11, 683.

Dwyer, F. M. (1978). *Strategies for improving visual learning*. State College, PA: Learning Services.

Flavell, J. H. (1977). *Cognitive Development*. Englewood Cliffs, NJ: Prentice Hall.

Goodenough, D. R. (1976). The role of individual differences in field dependence as a factor in learning and memory. *Psychological Bulletin*, *83*., 675-694.

Hessler, D. W. (1972). Interaction of visual 'compression' and field-dependence in relation to self-instruction and transfer. (Doctoral Dissertation, Michigan State University). University Microfilms No. 73-12735.

Karp, S. A. (1963). Field dependence and overcoming embeddedness. *Journal of Consulting Psychology*, *27*, 294-302.

Kirk, R. E. (1968). *Experimental Design, Procedure for the Behavioral Sciences*. Belmont, CA: Brooks/Cole Publishing Co.

Moore, D. M. & Bedient, D. (in press). Effects of presentation mode and visual characteristics on cognitive style. *Journal of Instructional Psychology*.

Whitley, J. B., & Moore, D. M. (1979). Effects of perceptual type and presentation mode in a visual location task. *Education Communications and Technology Journal*, *27*, 281-290.

Witkin, H. A., Dyk, R. B., Faterson, H. F., Goodenough, D. R., & Karp, S. A. (1962). *Psychological Differentiation*. New York: Wiley.

Witkin, W. A. & Goodenough, D. R. (1982). *Cognitive Styles: Essence and Origin*. New York: International Universities Press.

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their educational implications. Review of Educational Research, 47, 1-64.

Witkin, H. A., Oltman, P. K., Rashin, E., & Karp, S. A. (1971). Manual for the Embedded Figures Test. Palo Alto, CA: Consulting Psychologists Press, Inc.

Learning Styles and Visual Literacy: Connections and Actions

J. Robert Hanson, Harvey F. Silver, and Richard W. Strong

Introduction

Having worked in the area of psychological types and learning styles for the last 15 years, and having heard myself explain the many roles of visualization in learning I was pleased to accept Dr. Barbara Duffy's invitation to put my intuitions about the potential relationships between styles and visual abilities into a more sensate and structured form. My assertions are to be treated as conjectures in as much as the three interrelated fields of learning styles, levels of visual discrimination, and brain functioning are still largely in their developmental phases. Still, there are reasons to be optimistic about future developments.

Definitions

Visual literacy as a phrase is being treated, for the purposes of this paper, in two primary ways: 1) as that particular set of sensate functions of the eyes as they relay data from the retina to the occipital lobes for processing, i.e., the outer eyes of concrete forms, and 2) as that particular intuitive set of functions of the triune brain that perceives in non verbal ways in terms of image and symbol, i.e., the inner eyes of abstract constructions. Visual literacy includes both sets of perceptions in various combinations; never wholly one or the other. Thus the visually literate are best described as simultaneously sensate and intuitive. The sensate informs the intuitive by providing empirical data for use in conceptualizing. The intuitive informs the sensate by establishing value and focus, i.e., what to see and not see when looking. The degree to which one perceives concrete forms and immediate purposes or abstract ideas and metaphors is the degree of sensate or intuitive preference. We will discover that students who are dominantly intuitive tend to have more highly developed visual/spatial capacities than do the dominantly sensate and concretely-focused observers.

Objectives

Einstein on a train trip was unable, after much searching, to find his ticket. The conductor indicated to the famous scientist that there was no need to be concerned and that the ticket could easily be replaced. Einstein is said to have replied, "You don't understand the problem. Without my ticket I don't know where to get off." Ours is a similar problem. We need to know where we're going, at least in a general direction, and where we need, at least temporarily, to get off. Understanding the problem is critical to its solution.

Our understanding of the problem focuses on four objectives:

1. to introduce a Jungian-based model for looking at the intrapsychic behaviors that constitute four distinct learning styles. Intrapsychic models are those that focus specifically on the structure and functions of the psyche, and the conscious and unconscious elements that make up the daily operations that we call sensing and intuiting, thinking and feeling, and as modified by particular energy drives or what Jung termed introversion and extraversion.

2. to propose some relationships between these four styles and types of visual discrimination

3. to propose a hypothesis about how the four styles suggest a dominance and/or an overlapping of the various perceptual modalities, and

4. to suggest some instructional applications and some topics for much needed research.

Perceptual Conflict as Paradigm

The theme of Tulsa's Philbrook Museum's current exhibition, "Eloquent Objects," introduces the bilateral nature of the problem we're addressing. "Eloquence" suggests highly developed verbal capacity. "Object(s)" suggests a form to be visually or kinesthetically perceived. Hence, on first impression, the Museum's theme would appear to be a contradiction, i.e., how can non-speaking objects be heard, let alone be eloquent? This juxtaposition is, in all probability, the actual nature of perception. What we believe is what we are able to see. Believing is "seeing". Put another way, our prior learning patterns, our perceptual dependencies. (e.g., visual, auditory, kinesthetic, emotive, and our particular learning style) predetermine what we allow ourselves to perceive. These preconditioning patterns go by a number of names. For our purposes we'll use Thomas Kuhn's (1970) notion of the paradigm. One's personal paradigm is that conscious and unconscious set of assumptions, boundaries or beliefs that make up one's perceptual system, and that allow and disallow what is present to be perceived. One's collective paradigm, after Sapir and Whorf, is what one is allowed to see and think based upon the cultural evolution of one's language and its consequent perceptual strengths and deficiencies (Forsdale, 1981, pp 168-172). The individual's personal and collective paradigms are largely or totally out of consciousness. The unique set of culturally reenforced ways of perceiving, or, in a larger sense, "seeing" the immediate world around oneself is taken as universally representative. We see it that way until compelling evidence to the contrary forces us and our community to change its perceptions. From a Jungian point of view the problem is made more deliberately conscriptive because Jung (1965) stated that "It is one's psychological type which from the outset determines and limits a person's judgment." Our perceptions, then, are the result of a variety of prior conditioning factors of which psychological type is one, but limiting only to the extent that one's type remains hidden from consciousness. In order to enlarge or expand our ability to "see" we must first recognize and deal with these restricting "conditions" in our own thinking. The new paradigm must be to enlarge one's old paradigm ... since one can never perceive without some kinds of restrictions. It is the notion of self realization as journey and not as destination, as process and not as arrival, that allows for the expansion of the paradigm. And, since a paradigm is also a paradox, the more we are allowed to "see" the more we do not see. Or, put in a more positive vein, the more we see the more we understand there is to see.

The paradigm's effect, however, is not without cost. Ornstein, (1977, pp 4-5) commenting on Jerome Bruner's experiments in perception, noted that the individual's assumptions about reality are by their nature conservative of effort, i.e., having learned a variety of categorical systems one bets on the nature of reality as being everywhere similar. The brain learns, in effect, a patterned set of responses which it then imposes, without criticism or self awareness, on all new situations. Bruner's experiment had subjects looking at enlarged playing cards where hearts had been colored black and spades red, etc. Subjects when questioned as to the color of spades replied "black", though the cards were red, and of hearts "red" though they were black. Their preexistent knowledge was determinative. In Jungian terms every statement a person makes is a projection of the ego, and as such is self-limiting to the degree that the person is not known to himself. Shakespeare may have said it best when Malvolio in Twelfth Night says "There are no prisons so confining as those of which we're unaware." The "cost", therefore, of one's paradigm is in not seeing what is to be seen because it is not believed to be present. One is reminded of the classic tale of the six blind men and the elephant. Each "blind" person in describing the elephant described, quite authoritatively, only his own concrete and kinesthetic experience of the elephant. Again, the cost of one's conservative experience is the erroneous belief that one sees when, in effect, one does not. The paradigm as paradox is that in having only a part of the truth one doesn't have the truth at all. Truth, in this usage, is perceived as the more complete (and complex) nature of the idea, concept or object. What is seen then is restricted both by what is believed as well as by what is visually perceived. In each instance new learning reinforces the old until we are confronted with evidence that causes us to alter our prior beliefs. Thus, the issue is not one of an either/or, i.e., direct experience or intuitive symbol-making, but rather a both/and, direct experience and symbol-making. This perceptual problem has ancient roots dating back to the Platonic Idea of preexistent forms and Aristotle's structural/pragmatic and direct experience debate, i.e., Nominalism versus Realism. The debate continues unabated with Kant versus Locke, and today in the Gestaltists versus the Watsons and Skinners.

The idea of paradigm has been introduced to alert us to the continuing demand that we not only need to be aware of our own assets and liabilities as perceivers, but that we must also be continually learning new systems of classification and unlearning (the more difficult of the two) the old systems.

The specific extensions of our perceptual paradigms, for the purposes of this paper, are the roles of learning styles and the possible relationships of the modalities to specific learning styles. If a case can be made for learning styles as a conditioner or a determinant for what one is able to visually perceive, and that instructional personnel can identify these learning styles, then there is reason to be hopeful about the capacity of teachers to raise students' visual discrimination capacities.

Learning Styles as Visual Literacies

In order to condense the large body of information on learning style into the space provided we're identifying only those major behavioral elements necessary to this discussion. Readers are encouraged to enlarge their understanding by reviewing those asterisked titles indicated in the References. The learning styles model presented in this paper is an outgrowth of Jung's work on psychological types, (1921) as well as on the more specific identification of the paired functions developed by Isabel Myers (1962, 1982). There are probably 20 major applications of the Jung-Myers types (Hanson 1987), and virtually hundreds of studies on type with applications to education, counseling, career selection, school performance, etc. This rich body of materials is largely unknown within educational circles, or, if known, is largely underutilized. In using learning style information developers and users of visual discrimination research have an essential interpretive tool for enhancing visual discrimination skills among learners.

Quaternion: Four Learning Styles and Four Modalities

By pairing Jung's (1921, pp. 330-485) two perception functions, sensing and intuition, with the two judgment functions, thinking and feeling, one has four basic styles, i.e., sensing-thinkers (ST), sensing-feelers (SF), intuitive thinkers (NT), and intuitive feelers (NF). Each style, in turn, is modified by an energy-directing psychic attitude, i.e., introversion (I) or extraversion (E). Each of these six functions has specific relationships to the acts of perceiving. Additionally, each style has specific relationships to each of the four modalities, e.g., visual, auditory, kinesthetic/haptic, and emotive.

Styles of learning as the pairing of functions

The six functions are:

INTROVERSION (I)

The introverted learner brings energy to the learning situation by looking at the content to be learned in terms of his/her own values and interests. For learning that has any retentive value the introverted student must have time to think and reflect about that information in his/her own independent and highly individual way. How much energy the introvert invests depends on the degree to which the content increases that learner's own self-awarness and goals. Introverts seem to those outside, as if they were quiet, shy, withdrawn, and hard to get to know. Inroverts represent 25% of the student population but the use of the function is critical to success in school.

EXTRAVERSION (E)

The extraverted learner gets energy for learning by externalizing the content through personal interaction, sharing, and physical activity. For learning to have retentive value for the extravert the content needs to be assimilated in personal discussion, thru questions and answers, personal feedback, and affirmation of understanding by the teacher and peers. Thinking for the extravert is verbal interaction. The energy the extravert invests in learning is directly proportional to the opportunity s/he has for verbal give and take. Extraverts seem, to those on the outside, as if they were assertive, talkative, out-going, friendly, and easy to get to know. Extraverts generally have a difficult time in school because of the independent study emphasis.

SENSATION (S)

Sensing dominant learners want to collect information through their sense functions, i.e. what they can see, touch, hear, smell and taste. What they trust is what they can verify by their senses. As such they tend to have a here and now preference for learning that is focused on questions of practicality, functionality, doability, drill, practice, repetition, skill development usefulness, sequence, how to do it, and knowledge of what it's good for. Sensors make up 75% of public school student populations.

INTUITION (N)*

Intuitively dominant learners want to collect information through their intuitive capacities, i.e., to "see" the patterns, possibilities, relationships, meanings, gestalts, metaphors, dependencies, and understandings of the way data are interdependent. As such they tend to have a then and there preference for learning that is focused on what things mean, what their future uses and applications might be, and how things, ideas, issues fit together so that one can better understand the world and one's place in it. Intuitors make better students, usually, in public schools.

THINKING (T)

Thinking dominant learners want to make decisions about their perceptions based upon logic and analysis. What they trust is what can be explained and proven based on external evidence. As such the thinker tends to process information impersonally relying on data, inductive and deductive logic, reasoning, inference, cause and effect, facts, prior histories, evaluation based on objective criteria, and that which is externally verifiable. Thinkers make up 50% of the school age population.

FEELING (F)

Feeling dominant learners want to make decisions about their perceptions based upon personal, subjective feelings. What they trust is what feels "good" and what relates to their own personal value system. As such the feeler tends to process information in a highly personal and intimate way relying on like-dislike, comfort-discomfort, and the effects of other people on him/herself, and vice versa. The feeler makes judgments based on personal empathy, the need for group harmony, and the desire for personal feedback and affirming statements from others.

* N is used for intuition. I is used for introversion.

When a perception function (sensation or intuition) is paired with a judgment function (thinking or feeling) four different and behaviorally observable learning styles emerge. These four styles are modified by either an introverted or extraverted orientation.

SENSING-THINKING

The sensing-thinking (ST) learner prefers instruction that focuses on facts, drill, recall, demonstration, and especially on the physcial manipulation of tangible objects. This learner likes to know exactly what is expected, how s/he's doing at each moment, wants teacher/peer feedback on what's correct, feels best with right-wrong questions, enjoys doing things already mastered, relies on factual material, and is usually a good worker.

SENSING-FEELING

The sensing-feeling (SF) learner prefers instruction that focuses on personal values, interpersonal relationships, how learning relates to getting along better with one another, and demonstrations of empathy and support for one another. This learner likes to know how others feel, and wants support and encouragement from teachers and peers. This learner functions best in verbally interactive situations where one can learn through discussion and personal sharing. This learner learns best when content has personal meaning.

INTUITIVE-THINKING

The intuitive-thinking (NT) learner prefers instruction

INTUITIVE-FEELING

The intuitive-feeling (NF) learner prefers instruction that focuses on the meanings and relationships of data on idea, the interrelationship of ideas, and on how one can construct evidence for how things work. This learner wants to know why a thing is so, to explain its working relationships, and to understand meanings. S/he relishes experimentation, looking for cause and effect, inferring relationships, and defending ideas. They like problems that require logic, analysis, reasoning, and that can be defended based on external data. They generally are among the best students.

that allows for personal exploration of a subject or content of personal interest. This student brings, as does the SF, high levels of affective energy to learning tasks because of personal interest. As such the NF learner tends to function best in classrooms allowing a good deal of personal discretion, new challenges, creative and imaginative approaches, involvement in many different kinds of tasks, creative and artistic expression, and new and unusual applications of existing knowledge to new and different situations. The NF tends to excesses of degree but is often among the brightest of students if recognized and properly channeled.

These four basic learning styles each have their own assets and liabilities. Life becomes immediately difficult when one's learning assets are not matched to the demands of the environment, whether in school, workplace, or at home. The task within the instructional community is to identify the style or type of intelligence such that the learner's assets can be respected, and so that having been recognized for the ways in which s/he is intelligent the sense of personal validity and empowerment will carry them through the demands of a learning situation that is less compatible with or opposite to their style.

Intuitive Capacity and Visualization

In working with learning styles and visual literacy the roles of sensation and intuition are of particular interest. The sensor's tendency is to see things for what they are, i.e., to be aware of size, weight, color, texture, smell, form and use, whereas the intuitor goes beyond what's immediately visible, or the object's traditional functions, to consider other uses, forms and possiblities. The sensor's visual/spatial orientation looks for "what is", whereas the intuitor looks for what might be. When the sensor assesses what is s/he looks for verification through the tangible and concrete senses. When the intuitor assesses what is s/he envisions possibilities, gestalts, patterns, and relationships. Intuitors, then, as perceivers apparently operate on more perceptual levels, simultaneously, than do their sensing-dominant counterparts. We will discover as well, that intuitors fare better in the upper levels of academic achievement because of this broader conceptual capacity. The intuition's superior capacity to conceptualize and symbol-make, not being dependent on data from the eyes alone, requires that one theorize on the sources of these "in"-sights. One explanation is Jung's (1959) identification of the ancient and primordial images that constitute the essential elements of all psychic experience. These preexistent and universal energy forms, the psychological translation of Plato's Ideas, he called archetypes. Types, after the Greek typos, because they are rough molds or forms that require responses from us, i.e., the form is there as an undeniable inheritance that shapes our behavior, but the individual must respond to or fill the form in some way. The archetypes, in effect, shape the nature of our behavioral responses; consciously in terms of choices; unconsciously in terms of unacknowledged influences or drives.

The archetypes, like learning styles, are dynamic concepts, e.g., Great Mother, Anima, Animus, Child, Shadow, Trickster, Persona, etc., that have oppositional functions. The child in us, for example, is both a statement of our unlimited potential, on the positive side, and different forms of dependency on the negative side. Hence the degree to which the conscious mind can access the power of these unconscious and perceptual energy sources is the degree to which one intuits. Paradoxically the mind must look back, in effect; in order to look forward. The intuition then operates over a span of time from: 1) accessing the past through symbol and image making from the archetypes, to 2) the present in being stimulated through immediate sense impressions, to 3) the future relative to how past and present experiences are to be understood in terms of visualizations, gestalts, patterns, and metaphors. As teachers teach to the basic images of the archetypes across all the modalities, but particularly from pictures and three dimensional forms, students will not only have greater access to the perceptual energies of the unconscious, but will also have a developing picture of psychological wholeness, or, to use Jung's term, individuation (Jung, 1959).

The compulsion to actually teach to the archetypal images is necessitated by 1) the need to help students increase their intuitive and conceptual capacities, but on an equally important level to 2) introduce them to cognitive and affective wholeness through the presentation of fourness images. Jung's extensive exploration of these ancient psychic energy sources led repeatedly and across all cultures to the archetype of the Self portrayed as a four component mandala (Jaffe, 1979). This fourness, archetypally and imagistically - speaking, is a visual representation of what it means to be intellectually and emotionally mature. In psychological terms it means that the unconscious has been opened to consciousness, or, that the ancient and unknown perceptual powers of the unconscious are brought, over time, into greater rational employment. The Self, the supreme archetype, is explicated in the competent uses of each of the four functions and each of the attitudes. Learning styles, in effect, are a way to picture wholeness, both in terms of enhancing perceptual capacities, and for developing mature adults.

On the most practical of levels when instructional content is presented across all four learning styles, and in both introverted and extraverted ways, each student has both an increased opportunity to understand the information in his own style, as well as to consider the information on a broader and conceptually deeper level, i.e., in styles different than his/her own.

As educators, then, our task is, at least, fourfold: 1) to assist the sensors in developing increased ability to visualize, image and think in more symbolic and conceptual terms; 2) to assist all learners in becoming more perceptually aware in the use of all the modalities, e.g., active seeing and hearing, and increased kinesthetic learning through physical manipulations, 3, to help thinking-dominant learners become more aware of their own feelings (positive and negative), and the role of emotion in visualization, and 4) to improve every student's visual discrimination abilities.

Style and Visualization Strengths

Certain preliminary hypotheses may be made about the relationships between a particular learning style and a visualization capacity. We are using the word capacity in the sense of focus since no aspect of visualization is either right or wrong in a given situation. Rather, it is a question of appropriateness. If we then ask the question, "How does one see?" we can suggest the following sets of responses.

Sensing Thinkers (ST)
- see how to do it
- see what is practical
- see concretely
- see in the present
- "look" for verification through touch and manipulation
- see function

Sensing Feelers (SF)
- look inside the self (self-awareness)
- look inside others - empathy and perception
- see, as an aspect of self, the behaviors of others
- read the eyes, tonality, body movements

Intuitive Thinkers (NT)
- envision patterns and relationships
- see possibilities - what's "out there" as a pre-existent idea or form
- see holistically - as a whole, circularity, intactness
- see differences - compare and contrast spontaneously
- see complexity

Intuitive Feelers (NF)
- see as image, form, structure
- see as artistic self expression
- see aesthetically
- see metaphorically and poetically

see as dreaming
see as creating and synthesizing
see as symbol and archetypal accessing

With these sets of behavioral foci we can now propose relationships between perceptual orientations, learning styles and curricular issues, as follows:

Sensing Thinking (ST)

Curriculum goal: Mastery of basic skills and facts
Instructor's role: present data for memorization through drill and practice
Student's role: recall information
Problem sequence: define the problem and collect factual data
Overall emphasis: skills and knowledge
Typical teacher question: what, who, how, when and where?

Sensing Feeling (SF)

Curriculum goal: Involving students affectively by referencing appropriate prior learning experiences
Instructor's role: personally relate to the content indicating both one's positive and negative learning experiences
Student's role: reinventing the the self as a conscious ongoing process including positive and negative learning experiences
Problem sequence: selecting the problem(s) they want or are willing to work on
Overall emphasis: improved self awareness and the identification of learning assets and liabilities
Typical teacher question: what has your experience been? How do you feel about ...?

Intuitive Thinking (NT)

Curriculum goal: Understanding concepts and thinking critically
Instructor's role: present challenging questions for student analysis and explanations
Student's role: explain and provide proofs
Problem sequence: to solve the problem
Overall emphasis: capacity to operate logically, analytically and conceptually
Typical teacher questions: why? How do you know? How did you come to that conclusion? Cite your

Intuitive Feeling (NF)

Curriculum goal: Synthesizing and applying information in new and creative ways; making new applications
Instructor's role: facilitating environments in which students can explore possibilities; engage students in problems affecting the general good of the school and community
Student's role: explore the possibilities and search for new understandings and applications
Problem sequence: find the problem(s) that need to be solved and solve them
Overall emphasis: creative, innovative and artistic self

evidence. How do you explain ...?

expression

Typical teacher questions: What would happen if ...? Create a metaphor for .... How would life be different if ...? Draw. Sculpt. Paint. Mime. Visualize in your mind .... Dramatize. Poetize.

These characterizations provide teachers with an operational model for increasing learner intelligence by affirming the student's innate capacities or style, and then by challenging the student to operate in positions that demand that s/he flex and experiment with other modes of perceiving and judging.

The work the implementation of this model entails is worth the effort. First, the students learn and retain more because they are developing competencies in each of the functions, attitudes and modalities. Second, the content is being presented in both broader and deeper ways; broader because more data are presented on more topics, and deeper because the material is conceptually explored in terms of whys and applications. Third, and simultaneously, the presentation modes are addressing the developmental needs of the students for psychic wholeness. In effect, the curriculum of self invention, the sensing-feeling position, is the curriculum in which the teacher flexes his/her own style in order that instruction may occur in each of the four positions, and in each of the four modalities.

Developing Visual Literacies

The data on school achievement and learning style make it very clear that intuitives function more effectively than sensors, and thinkers (at least within traditional educational settings) function at higher levels than feelers.

Hanson and Silver (1984, pp.4-7) found high positive correlations between particular learning styles and higher order cognitive achievement. Using the Myers Briggs Type Indicator and the Longeot Test of Reasoning (1980) the authors found the highest scores on concrete and formal operations test items among the dominantly intuiting students. Combined means for learning style and formal operational type questions were as follows:

Table 1

Learning Styles by Combined Means

Learning Style	Combined X's
Intuitive feelers	84%
Sensing feelers	55%
Intuitive thinkers	51%
Sensing thinkers	43%

The investigators also found that Piaget's (Wadsworth, 1978) stages of development theory were corroborated from this population of 300 middle school students. The data are as follows:

Table 2

Longeot Means by Grade Levels and Learning Styles

Grade Level	N	ST Mean	SF Mean	NT Mean	NF Mean
6th	110	49.10	53.11	58.07	63.14
7th	91	44.71	55.53	65.00	78.75
8th	100	55.88	55.70	62.94	68.47

Intuition matched with feeling or thinking also tended to distinquish consistently high achievement scores on the California Achievement Tests on mathematics and language, as follows;

Table 3

Differences Among Learning Styles on the M.B.T.I.
as Reflected in C.A.T. Math Achievement Scores

Group	N	Mean Scores for CAT Math				F Value	P Value
		Sensing Thinking	Sensing Feeling	Intuitive Thinking	Intuitive Feeling		
All Students	289	58.4	63.9	68.3	71.8*	12.89	0.0001
Grade 6	98	58.9	62.7	67.5*	65.1	1.71	0.17
Grade 7	91	56.5	69.3	68.4	80.7*	10.72	0.0001
Grade 8	100	60.0	61.8	68.8*	66.9	3.07	0.03
Introverts	111						
Extroverts	178						
Boys	135	58.2	57.7	67.1	71.1*	4.55	0.01
Girls	154	58.7	65.1	70.8	72.1*	7.95	0.0001

---

*Shows group with highest mean score.

Table 4

Differences Among Learning Styles on the M.B.T.I. as
Reflected in C.A.T. Language Achievement Scores

Group	N	Sensing Thinking	Sensing Feeling	Intuitive Thinking	Intuitive Feeling	F Value	P Value
All Students	289	58.5	66.2	70.6	74.3*	15.53	0.0001
Grade 6	98	61.9	72.3	75.8*	74.6	4.58	0.005
Grade 7	91	55.4	70.3	67.4	80.2*	12.60	0.0001
Grade 8	100	58.1	57.0	68.2*	67.3	4.17	0.01
Introverts	111						
Extroverts	178						
Boys	135	57.9	58.3	70.1	74.6*	7.04	0.01
Girls	154	59.4	67.8	71.7	74.3*	7.57	0.0001

---

*Shows group with highest mean score.

These four sets of data make it increasingly clear that one of the major functions operating in higher level cognitive operations is that of intuition, and secondarily of intuition paired with feeling or thinking. The authors conclude with the statement that there is a need to orient more of classroom instructional practice such that all students can learn to operate more successfully in the intuitive modes (Hanson and Silver, 1981).

The following percentages (Natter and Rollins, 1974) show the relative frequency of sensing and intuitive types at different levels of scholastic achievement:

Table 5

		Sensing	Intuitive
671....	Finalist for National Scholarships	17%	83%
3676....	Freshman at Ivy League Colleges	41%	59%
3503....	Academic 11th and 12th graders, P.A. H.S.	58%	42%
1430....	Non-academic 11th and 12th graders, PA H.S.	85%	15%
500....	Adults who did not finish 8th grade	99.6%	0.4%

One must not conclude from these data that intuitors and thinkers are more intelligent than sensors and feelers. Rather, it is the way that instruction has traditionally been provided that penalizes the sensors and feelers and rewards the intuitors and thinkers. Traditional classrooms place the student in a role where the teacher does most of the talking, the material presented tends to be abstract and symbolic, basic information is presented through lecture or reading, and students work alone with books and papers, and generally without tangible or manipulative resources for kinesthetic perception. What for the sensors and feelers are major obstacles to perception are for the intuitives and thinkers their operational preferences, e.g., visualizing, conceptualizing, patterning, thinking about sequence, relationships and defensible positions. To compound the difficulty classroom instruction also favors the introvert over the extravert. Not surprisingly, introverts tend not only to score higher on intelligence tests, but also to stay in school longer. The classroom is biased against the extravert in that student talk and group discussion constitutes a very small percentage of actual presentation time. The introvert, on the other hand, is more comfortable working quietly and independently, and does not have the need to talk about his or her ideas in the in-take or perceptual stages; in fact, prefers not to talk until conclusions have been formed. In short and paradoxically, the successful student in the traditional classroom flexes least and achieves the most, i.e., the introverted, intuitive thinking and closure-oriented types. If a student functions well in school but is not an introverted intuitive thinker the chances are that that student is not only working very much harder, but is also flexing out of his/her style most of the time. Ironically, though clearly not by institutional design, the student who is actually learning the most is not the academically achieving student, but the student who has learned to flex across the various styles and modalities. Their higher intelligence comes not from any help authorities gave them, but from a capacity to leave their dependent strengths and to explore their lesser developed functions. Hence their intelligence consists not only in their capacity for change and experiment, but also results from accessing more of their psychic functions and physical modalities.

As educators our supreme challenge is to reorganize instruction in such a way that every learner is encouraged or required to flex over each of the styles and each of the modalities. A place to begin this change process is by increasing students' visual capacities or literacies.

Literacies as Perceptual Emphases: Four Positions

Literacies can be perceived as styles of learning according to their different perceptual emphases.

Cultural Literacy of Basic Skills

1) In the sensing-thinking position, the focus of the 70's, the visual literacy emphasis is on recalling extensive amounts of pertinent information. One theorist, E.D. Hirsch (1987) goes so far as to say that cultural literacy consists of knowing, for rapid recall, several thousand pieces of information about persons, places, dates, things and ideas. This data base allows a person to read well enough to function successfully in our modern society. What Hirsch is addressing is the need for mastery learning. Mastery learning processes have a very high dependency on associational thinking as part of the perceptual process. Immediate recall is the result of drill, repetition and frequent usage.

Association, however, has very high visual connections, e.g., one sees a page, a sign, a view, a list, etc. Associational skills occur across all the modalities, but apparently visual association works particularly well for school achievers. Auditory recall procedures appear to be a sensing-feeling favorite, but students don't usually receive many auditory memory clues in traditional presentations. Students with very high factual recall often cite as the recall process "seeing" the data in some physical form, e.g., on a page, as a list, as an acronym, as a code, as a graphic, etc. Associational recall tasks tend to be visually static, i.e., what is seen is not moving. Data appear as data, and are inert.

Cognitive Literacy

2) In the intuitive thinking position, the focus of the 80's, the visual literacy emphasis takes the form of cognitive categories, i.e., some of Bloom's (1956), Guilford's (1977), Thurestone's (1937) or Piaget's (Furth, 1969) "higher level" functions. Cognitive literacy takes the form of activating certain mental processes, e.g., postulating, hypothesizing, comparing, rotating, juxtaposing, reducing, changing, etc. These processes, both in their forms as question and response, require a visually active process. The learner must visually move around, surveying the past, looking around in the present, and projecting into the future, and manage the reorganization of pertinent data in order to "draw" conclusions. The cognitive literacy categories necessary to academic success are analysis, application, categorization, classification, evaluation, and synthesis. These "processes" require that the learner visually explore the possibilities, i.e., to operate divergently to stimulate a network of associations and connections. The processes are brought to closure by operating convergently. The intuitive image/symbol capturing capacity has been matched with thinking's focus on analysis, synthesis and application. Image, symbol and metaphorical capacity, thing-making, attest to the visual and intuitive requirements of higher level thought. A random review of 10 tests of intelligence indicates that as high as 60% of the items, before any kind of mediational activity can begin, require highly developed visual discrimination skills. If an immediate educational goal is to have students increase intelligence scoring then instruction will need, necessarily, to focus more consistently on teaching the seven sets of basic visual discrimination skills.

The Literacy of the Self

3) In the sensing feeling position, the focus of the 60's, the emphasis is on self discovery and awarness, or, the literacy of the self. The ability to see oneself in terms of strengths and weaknesses, capacities and dependencies, successes and struggles, comforts and irritations, and at some point along a continuum of personality development, is the literacy of the self. Volumes could (and should) be written about how ineffective our institutions are, (not just schools) in helping students develop, legitimately, a sense of positive self worth. We are a culture that does not honor and respect its youth because, until employable, we have no critical role for them in the

improvement of the society or in earning their "keep". Self-lessness is the bitter end result of feeling useless. The nation is not at risk because kids can't read and write. It is at risk because they cannot see any authentic role for themselves in their own institutions. Basic skills training for students with low self esteem is heartless. We remember the things that are important to us, and the self always comes first. Everything that we are successful in doing is based on the self.

Schools can provide leadership in bringing the society to a new respect for its youth by doing two things: 1) establish programs to help students reinvent themselves by addressing all the developmental aspects of personality, i.e., teaching and recognizing achievement across all the positions and modalities, and 2) involving students in meaningful programs to improve the quality of life in their own neighborhoods. These community involvement programs will require imagination and work. The programs will vary widely even as the needs of various communities vary widely. It is the process which counts. It means involving students in their community as individuals in their own right who can plan and implement needed changes for the improvement of life. We cannot just talk about respecting our youth. We must provide opportunities for them to demonstrate their abilities to make critically needed contributions to their own communities. Community service is a curriculum for improved self concept.

The literacy of self is also the developing capacity to see one's self worth, one's potential for development, and one's progress toward a more fully developed self.

Visual Literacy

4) In the intuitive feeling position (hopefully a focus for the 1990's), the emphasis is on visual literacy. Visual literacy perceptually requires the broadest applications of the intuition in order to consider many possibilities, patterns and relationships. The feeling judgments provide the intuitor with the psychic energy to search for syntheses, elegance, aesthetics and "fit". Perception in the NF position, at its best, is insight!

By visual literacy we mean the capacity to:

1) recognize instances of the same element in different contexts
2) produce graphic likenesses
3) recognize an object when seen from different angles (Gardner, 1983, p. 170)
4) transform one element into another by imagining movement, rotation, inversion, or internal displacements among the parts (Thurestone, 1937, pp. 32-39)
5) identify lines of force, tension, balance and composition, i.e., to identify the principles that make the visual arts asthetically satisfying (Aero and Weiner, pp. 65-74, 1983)

6) identify or correctly configure elements within a spatial configuration which would otherwise represent distortions because of the observer's orientation (Karp, 1962, Witkin, 1954) and
7) identify resemblances, symbols or signs across seemingly unrelated areas of existing knowledge or personal experience (Gardner, 1983)

Current educational research on effective instructional strategies (Joyce, Showers and Rolheiser-Bennet, 1987, pp. 11-23) supports our contention about the need for visual supports for learning. Citing Ausabel (1963) the authors' point out that student retention increases by an "effect size" of 1.4 when learning is presented using various types of visual organizers. An "effect size" is roughly equivalent to a single standard deviation. With such an effect the average student studying with the aid of visual organizers learns about as much as the 90th percentile student studying the same material without the assistance of the visual organizer's ideas. Visual organizers, the authors note, are especially effective for the sensing-oriented learners.

Richard Samson (1975, p. 17) identifies seven thinking functions necessary to effective intellectual performance. After Albert Upton (Samson, P. 17) he cites:

1. word recognition and definition
2. thing making using mental pictures
3. making qualifications, i.e., noticing similarities and differences
4. ability to classify, i.e., sort things/ideas into classes
5. structurally analyze, i.e., observe how things are made and break them down into their component parts
6. operationally analyze, i.e., notice how things happen in successive stages, and
7. make analogies i.e., see how seemingly unconnected situations are alike.

The student of visual discrimination skills will have immediately noticed that six of the seven primary intellectual skills are first and foremost the literacies of visual discrimination, i.e., recognition, mental pictures, noticing, sorting, observing, noticing and seeing. In all probability a case could be made for all mental processes having aspects of visual literacy as a prerequisite for any kind of mediational thought.

In looking at Thurestone's (1937) lists of higher level mental functioning the role of visual discrimination skills is virtually tantamount to current day discussions of higher order cognitive abilities. If we look at the six higher level teaching strategies below (NT, NF) we discover the following visual discrimination correlations:

Uses of the Hanson Silver Teaching Strategies

Teaching Strategies	Thurstone's Abilities
Concept Attainment	Figure comparison Associated objects Picture naming Visual discrimination Accuracy of perception Oral communication
Inquiry Training	Classification Associated objects Accuracy of perception Oral communication
Concept Formation (Development)	Understanding larger verbal units Figure comparisons Classification Associated objects Size discrimination Picture naming Oral communication Visual discrimination
Interpretation of Data	Classification Associated objects Size discrimination Visual discrimination Accuracy of perception
Application of Principles	Classification Associate objects Oral communication Accuracy of perception Visual discrimination
Creative Problem Solving	Oral communication Picture naming Associated objects Classification

These data suggest a second critical variable for the reorganization of teaching, curriculum and the physical structure of schools, i.e., that the visual/kinesthetic modalities need to be made a major part of the curriculum and learning process, and to take their rightful place as a critical component of basic skills learning.

Modality and Learning Performance

Many educators have long recognized the need to provide instruction across each of the three recognized modalities, i.e., visual, auditory and kinesthetic input processes. The recognition was qualified, however, by three questions: 1) was the differentiation accurate and comprehensive, e.g., might there be other basic modalities, and/or was there a better way to describe the actual modal operations? 2) was there a compelling rationale for going to the additional effort and cost of restructuring curriculum and teacher training to teach to all of the modalities?, and 3) if the answers to items 1 and 2 were affirmative how would one go about doing so?

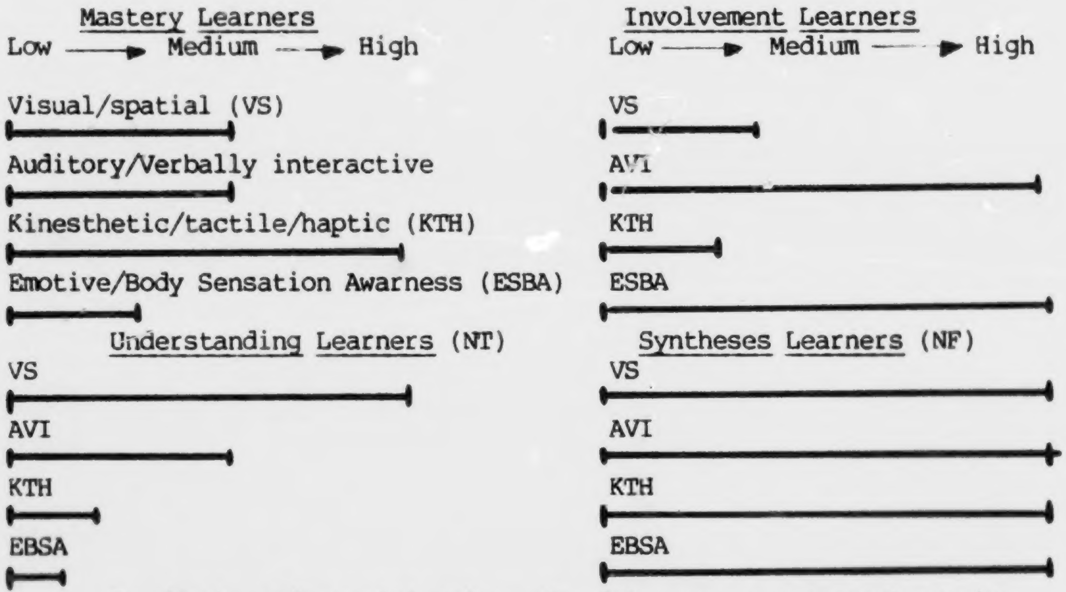
First, educators have become increasingly aware, though the research has not kept pace with the awareness, that there is a fourth modality, i.e., the emotive and body awareness states that contribute to or severely inhibit learning of any kind. We are only now beginning to see what mothers could have told us long ago, i.e., that the student's anxieties, fears and apprehensions are not only directly contributory to school failure, but are cummulative over time and thus lead to the self-fulfilling prophecies of school failure based on, correctly enough, the evidence of past failure. In these instances it is not intellectual capacity that is at question, but, rather, the student's inability to deal objectively with his/her own emotional drives. On the positive side of this same modality students that function well begin to perceive themselves as bright and capable. These cummulative emotions play a powerful role in generating new interests in learning as well as in assuming a capacity for the new learning. We are all familiar with the effects of affirmation on student behavior. What we need to be even clearer about is that what teachers say to students, or administrators to teachers, becomes immediately a part of perception on the level of self, and how one self-perceives determines what one can allow oneself to learn. Thus educators need to look at a fourth modality that we call emotive/body sensation awareness. This distinct modality, like its perceptual counterparts, is non-rational. Unlike its counterparts it represents an internal processing following the multiple perceptual operations.

This new modality instantaneously accompanies the brain's rational processing of the perceptual stimuli. Its emotive nature as self-defending or self-enhancing immediately results in changes in affect, i.e., discouragement, ennui, disorientation, dismay and alienation, or, on the other side, curiousity, interest, animation, involvement and alertness. All these emotive responses, though often out of student awareness, can be seen by the observer in facial expression, body positioning, eye movements, and the use of predicates.

Second, the compelling rationale for restructuring teaching and curriculum, the Siamese twins of instruction, comes from the data (Hanson, 1988, pp. 12-14) on the achievement of the very brightest and most productive - the thing-makers - of students, the dominantly intuitive-feeling (NF) learners. Students scoring the highest in Piaget's formal operations functions on the Longeot Test of Reasoning (Hanson, et al, 1983), and many at a younger age than Piaget's research suggested, were dominantly of this style. This same learning style is often, paradoxically, not noticeably successful in traditional classrooms. When provided with resources, however, and the opportunity to pursue their own interests according to their own study habits, extraordinary growth, learning and artistic expression occurs. What we know about intuitive feelers is that there is a confluence of the various modalities rather than the use of only one or two to the virtual exclusion of the others. The repeated uses of all the modalities is consistent with the perception and judgment preferences of the intuitive feeler, i.e., that the intuitive functions are stimulated visually/spatially, auditorily, through the various large and small muscle operations, and through the emotive energy that drives the learner in pursuing his/her own interests. And, on the "judgment" level the student's high energy output resulting from the role of feeling, a rational function, in deciding the issues of like/dislike, and aesthetic satisfaction.

The graph which follows suggests the strengths of the various modality functions according to each of the four learning styles. These strengths or dependencies are inferred as a result of the style's cognitive capacities and the degrees of affective involvement in one's work.

Learning Styles and Modality Dependencies



In short, and provisional as the data are, an argument can be made for the improvement of instruction through the deliberate presentation of content, not only in the four styles, but across the four modalities.

Third, how is such instruction to be accomplished? Each instructional decision a teacher makes needs to reference four discrete but interrelated issues, i.e.,

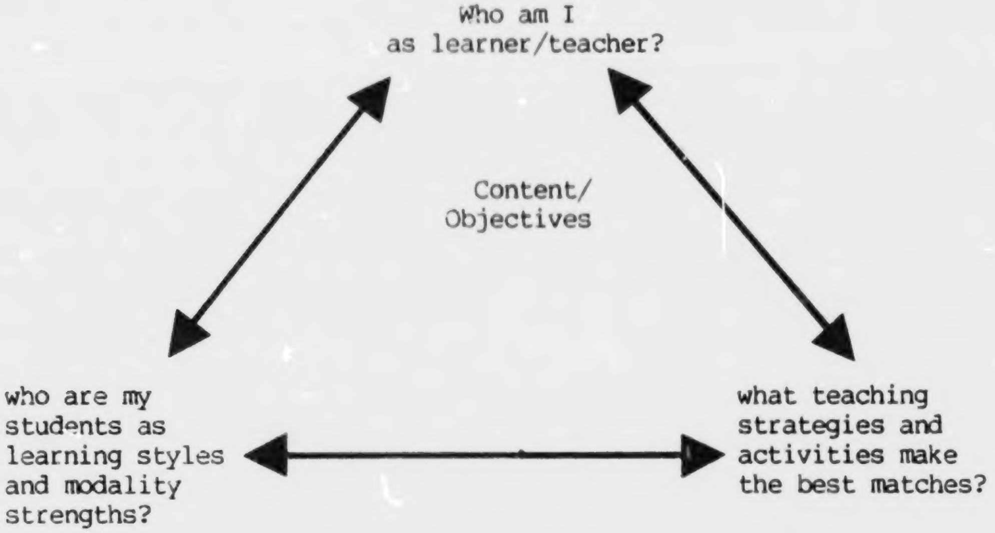
1) who am I as a learner, and what effects do my own learning preferences have on the ways and the content I teach? How do my preferences affect students whose styles are opposite to my own? Do I

tend to overlook content that I don't like or that is outside my own style?

2) what functions must the learner exercise effectively to learn the content/objectives I'm teaching? How is the material to be categorized in terms of learning style strengths or dominant functions?

3) who are my students as individual learning styles? Or, what is the learning profile of my class, i.e., what percentages of my students are ST's, NT's, NF's, SF's, I's or E's, V/S's, A/VI's, KTH's or E/BSA's?

4) what teaching strategies make the best "fit" between my content and the students I'm teaching? What additional strategies do I need to learn to make content presentations for each of the learning styles? Hence,



The interrelatedness of these issues reminds us once again of the life as journey metaphor. Clearly there are things in our instruction that we do well. Equally clearly there are things we need to learn to do better. The challenge in becoming truly professional is to be able to teach to each of the styles and modalities, to marry the science and the art of instruction, and to see the circularity of wholeness. Hippocrates was right.

Finally, readers are directed to the Appendices for specific suggestions in each of the four positions over the topics of learning activities and materials, basic resources, teaching strategies, and evaluation techniques.

Conclusion

My argument addresses the need to alter existing instructional paradigms by teaching to each of the four basic learning styles. The argument proposes that by doing so each of the four modalities will be more frequently evoked. The argument concludes by suggesting that since intuitive-feelers tend, as a particular style, to be the most creative and to get the highest scores on measures of high level cognition (Piaget's formal operations) that those same achievement behaviors can be evoked for more students by using each of the modalities and style presentation techniques in our instruction. Finally, I've argued that the new basic skills emphasis must include a concentrated emphasis on evoking the seven visual discrimination skills since visual discrimination tends to be a prerequisite to most forms of higher level cognition.

This circularity of issues, the need to "teach around the curriculum wheel," i.e., to present instruction in each of the four learning styles, and simultaneously across each of the four modalities, brings us back to the quote on the title page from Hippocrates. Oneness, wholeness, mental and intellectual health, require that the student, the curriculum, and the teaching act be seen as a unity. In this unity there is an interdependence. It is the interdependence of the parts that gives us the capacity to learn, and in learning, to change. T.S. Eliot (1934) may have said it best:

"We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time."

The Four Quartets

References

Aero, R. and E. Weiner, The Brain Game, New York, Quill, 1983.

Ausabel, D., The Psychology of Meaningful Verbal Learning, New York, Grune and Stratton, Inc., 1963.

Bandler, R. & Grinder, J., The Structure of Magic, Palo Alto: Science and Behavior Books, 1975.

Bloom, B., (Ed). Taxonomy of Educational Objectives: Handbook I: Cognitive domain. New York: David McKay, Inc. 1956.

Eliot, T.S. The Complete poems and plays, New York: Harcourt, Brace and Co., 1934.

Forsdale, L., Perspectives on Communication, Reading, Addison-Wesley, Ma., 1981.

Furth, H. G., Piaget and Knowledge: Theoretical Foundations, Englewood Cliffs, N.J., Prentice Hall, 1969.

*Gardner, H., Frames of Mind, The Theory of Multiple Intelligences, New York, Basic Books, 1983.

Greene, J., and D. Lewis, Know Your Own Mind: Nine Tests That Tell You What You Do Best, New York, Rawson Assc's. 1983.

Guilford, J. P. Way Beyond the I.Q.: guide to improving intelligence and creativity. Buffalo, New York: Creative Energy Foundation, Inc. 1977.

Hanson, J. R., An Historical and Critical Analysis of Learning Style Models, Moorestown, N.J.; Hanson Silver Strong & Assc's, Inc. Publishers, 1987.

Hirsch, E. D., Cultural Literacy

Jaffe, A., C. G. Jung: Word and Image Princeton University Press, 1979.

Joyce, B., Showers, B., & Co. Rolheiser-Bennet, "Staff Development and Student Learning: A Synthesis of Research on Models of Teaching", Educational Leadership, Vol. 45, No. 2, Oct. 1987, pp 11-23.

*Jung, C. Man and his symbols. New York: Dell Publishing Co., 1964.

*Jung, C. G. Memories dreams and reflections. New York: Vintage Books, 1965.

*Jung, C. G. Psychological types. Princeton, N.J.: Princeton University Press, Ballingen Series XX, 1971.

*Jung, C. G. Symbols of transformation, Princeton, N.J.: Princeton University Press, Vol. 5, 1956.

*Jung, C. G. The archetypes and the collective unconscious. Princeton, N.J.: Princeton University Press, Ballingen Series, Vol. 9, Part 1, 1959.

Karp, S. A., (Ed.) Kit of Selected Distraction Tests, Brooklyn, N.Y., Cognitive Tests, 1962.

Kuhn, S. The structure of scientific revolutions. 2nd edition, University of Chicago Press, 1970.

*Myers Briggs, I. Introduction to type. Gamesville, Fla.: Center for the applications of Psychological Type, 1962, 2nd edition.

Natter, F. & Rollin, S. (Eds). The Governor's Task Force on disruptive youth: Phase II report. Tallahassee, Fla.: Office of the Governor, 1974.

Ornstein, R. E., Psychology of Consciousness, New York, Penguin, 1972, 19-20.

*Rychlak, J. Introduction to personality and psychotherapy: A Theory-construction approach. Boston: Houghton Mifflin, 1973.

Samson, R., Thinking Skills, A guide to Logic and Comprehension, Stamford, Ct., Innovative Sciences, Inc., 1975.

Thurestone, L. L., Psychological Tests for a Study of Mental Abilities, University of Chicago Press, 1937.

Witkin, H. A. Personality through perception. New York: Harper and Brothers, 1954.

APPENDIX A

Learning Activities and materials by styles

Each learning style has it's own preferred forms of self reinforcement. Samples follow:

ST Mastery Learners

workbook, worksheets
repetitive learning games
drill and repetition
field trips
demonstrations
dramatizations
making dioramas
making useful things
arts and crafts
"how to do it" books
copying
following directions
using biographies
adventure stories
computations
record-keeping
collecting facts
making displays
listing things
collecting things
making scrapbooks

SF Involvement Learners

directed art activities
personal journals, logs
being read to and reading aloud
books about people and their personal experience
books about feelings
role plays
acting
group sharing
team games
group projects
group dynamics
giving and receiving personal feedback
dramatic presentations
trust building "show and tell"
oral reports
sociograms
consensus decision making
establishing personal goals
opinionaire

NT Reasoning Learners

independent research
writing term papers
writing essays
designing an experiment
performing a study
games requiring strategic thinking
lectures
debates
panel discussions
interpreting data(charts,graphics)
goal setting
brainstorming
using Force Field Analysis
evaluating alternatives
challenging experts
mysteries
word problems
using inquiry methods
organizing and directing

NF Creative Learners

creative arts activities
dramatic arts
boundary breaking
solving old problems in new ways
guided imagery
fantasizing
meditation
daydreaming
self-expressive activities
creative writing
mythology
humanities/social studies
values clarification
future sciences
generating alternatives
Utopian thinking
creating a story
designing
use of metaphors

simulations
science fiction books
problems of logic
developing plans
doing needs assessments

open-ended discussions
symbolic representations
making art objects, collages
discussing social dilemmas
imagining

APPENDIX B

Basic Resources

In order to better appreciate the contributions of different kinds of staff development it's often helpful to see how each tends to fall into one primary learning style quadrant. By assigning each program to a style we can better balance training programs.

Sensing-Thinking programs focused on basic skills and mastery learning

- Hunter's Essentials of Instruction (I.T.I.P.)
- Workbook programs
- Drill and memorization programs
- Bloom's Mastery Learning
- Programmed Learning
- Software programs that are essentially true/false and repetitive in nature
- Instruction focused primarily on recall
- Basic skills programs
- Hanson Silver Strongs' Teaching Strategies

Sensing-Feeling programs focused on improved self awarness, communication and socialization skills

- Cooperative Education
- Self awareness strategies
- learning style models, e.g.,
  - Hanson Silver Strong's Teaching Learning and Curriculuum Model
  - Bernice McCarthy 4 Mat Model
  - Dunn and Dunn
- Role playing
- Circle of Knowledge
- Counseling programs
- Fairy Tales
- Biographies and autobiographies
- Hanson Silver Strongs' Teaching Strategies

Intuitive-Thinking programs focused on critical thinking and concept development

- Whimbey's reasoning model
- Meeker's Structure of the intellect model
- David Kolb's problem solving model
- Hilda Taba's thinking strategies
- Barry Beyer's critical thinking model
- Art Costa's triarchic model

Intuitive Feeling programs focused on creative, divergent and metaphorical thinking, and on the development of aesthetic and ethical development

- deBono's lateral thinking model
- W. J. J. Gordon's Synectic model
- Betty Edward's right-side of the brain activities
- Lawrence Kohlberg's and Carol Gilligan's moral development models
- Ethical inquiry models
- Creative and metaphorical thinking models

Robert Sternberg's triarchic model
Richard Samson's thinking skills
Hanson Silver Strongs' Teaching Strategies

Problem-solving models
Imagery procedures
Hanson Silver Strongs' Teaching Strategies

APPENDIX C

Categorizing Teaching Strategies According to Learning Styles and Educational Goals

ST Mastery Strategies for basic skills and memory development

Command
Practice
    Directed
    Guided
    Independent
Graduate Difficulty
New American Lecture
Peer Practice
Independent

Generic emphasis:
    Categorizing
    Mnenonics (recall skills)
    Drill and repetition
    convergent thinking
    deduction

SF Involvement Strategies for self awareness and personal and social maturity

Peer Practice
Team Games Tournament
Circle of Knowledge (DISCUSS)
Self Concept
Group Membership
Metacognitive strategies
    use of predicates
    anchoring and reframing
relaxation techniques
goal identification

Generic emphasis:
    self awareness
    personal sharing
    giving and receiving feedback
    role playing
    active listening

NT Understanding Strategies for critical and analytical thinking

Concept Attainment
Cause and Effect
Compare and Contrast
Inquiry
Interpretation of Data
Independent Study

Generic emphasis:

    Inference
    Induction/deduction

NF Synthesis Strategies for creative and divergent thinking, and for the development of easthetic and ethical awareness

Divergent Thinking
Concept Formation
Metaphorical Problem Solving
Creative Problem Solving
Decision-making Dilemmas

Generic emphasis:
    imaging and imagination
    associative and creative thinking

Evaluating
Divergent thinking
Classifying
Summarizing
Analyzing
Hypothesizing

fluent, flexible and original thinking
forced associations, conscious self deceit, and personal and direct analogies
metaphorical thinking
artistic expression
ethical inquiry/moral development

APPENDIX D

Evaluation Techniques Categorized According to Educationl Goals

Evaluation techniques are categorized according to the types of learner behaviors in question. Evaluation techniques should match the type of learner behaviors required.

ST Mastery Techniques

- Testing
    - true/false
    - multiple choice
    - fill in the blank
    - circle
    - complete the sentence
- Demonstrations of specific skills with correct/incorrect sequences
- Checklist
- Mechanical devices for demonstration of specific skills
- Recitations
- Oral reports on factual data
- Data from unobtrusive evaluations by trained observers against predetermined criteria

SF Involvement Techniques

- Oral reports
    - individual on projects with person meaning
    - team reports
- Interviews
- Role playing
- Ranking procedures pertinent to issues of personal value, like/dislike
- Self awareness inventories
- Sociograms
- Data from unobtrusive evaluations relative to group process issues, sharing of personal feelings, ability to listen, empathy, approach and avoidance behaviors
- Group effectiveness measure
- Group observational tools
- Involvement in group discussions

NT Understanding Techniques

- Essays evoking analytical and reasoned responses
- Interviews stressing student's abilities to think critically and analytically
- Debates
- Ranking and classifying tasks

NF Synthesis Techniques

- Essays on open ended questions
- Creative writing tasks
- Creative projects
- Debates on ethical issues
- Problem solving relative to moral issues
- Activities that challenge the student to think metaphorically, divergently, etc.

Reading for inference tasks
Writing research reports
Deductive logic questions
Inductive logic questions
Data from unobtrusive evaluations based on student's planning and execution of thinking tasks

Art projects
- visual
- performing
- manual
- auditory

Unobtrusive evaluations based on student insight, student "products", student involvement in the task
Measures of fluency, flexiblitiy, originality

Developmental Techniques to Promote Research and Learning with Visuals in the Affective Domain

Darrell G. Beauchamp

In 1986 this author set out to study the effects of visuals on affective response and cognitive achievement (Braden & Beauchamp, 1986). From the outset, the dirth of established techniques for the study of visuals and their role in the affective domain was a problem. Most research relating to the effectiveness and use of pictures indicated that although there is a large assortment of research available on the these topics, that research is extremely scattered. In addition, other than the popular Dywer heart studies, few models for the study of either visuals or their affects in the affective domain are available.

In response to the lack of appropriate instruments to study the chosen topics, consideration was given to the development of new instruments and new techniques. The primary medium selected was the slide + tape presentation.

In an attempt to overcome several methodological problems, a new model was developed to study the effects of pictures in the affective domain. Its purpose was to identify the effects of slide + tape presentation type on affective response to: the presentation itself; the visuals of the presentation; the soundtrack of the presentation and the topic of the presentation. A quasi-experimental design, using four separate slide + tape presentations, was employed. A two continua approach to the development of presentations was used, establishing "visual" as one continuum and "audible" as the other. Both continua used "verbal" and "non-verbal" as their bi-polar extremes. A matrix describing the resulting presentations is shown in Figure 1.

Once the presentations were developed, the question of how to obtain measurable information was raised. In addition to traditional techniques, naturalistic inquiry techniques were employed to gather data. Although the slide + tape presentations were specially devised to elicit both cognitive and affective responses, the original instruments were primarily suited only for gathering traditional types of data. For example, multiple choice questions were used to gather information in the cognitive domain while semantic differential scales were used to gather afffective data.

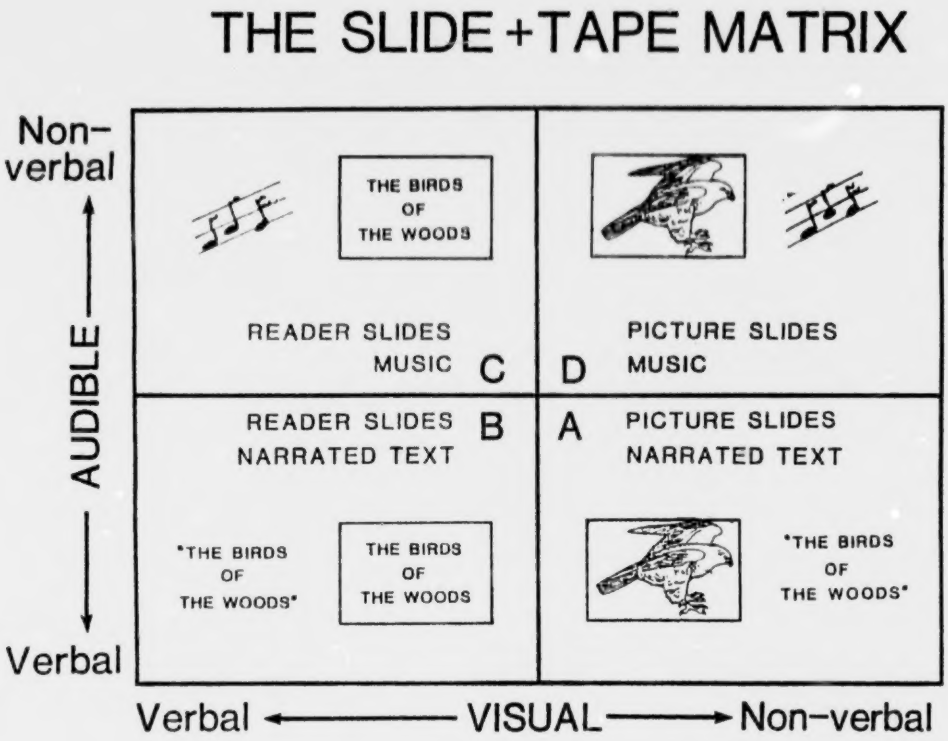

THE SLIDE + TAPE MATRIX
Non-verbal
AUDIBLE
Verbal
THE BIRDS OF THE WOODS
READER SLIDES
MUSIC
C
D
PICTURE SLIDES
MUSIC
READER SLIDES
NARRATED TEXT
B
A
PICTURE SLIDES
NARRATED TEXT
"THE BIRDS OF THE WOODS"
THE BIRDS OF THE WOODS
"THE BIRDS OF THE WOODS"
Verbal
VISUAL
Non-verbal

Figure 1. Four slide + tape presentations using the extreme elements of the audible and visual continua.

Upon reflection, it became clear that if the true effects of the the visuals on the affective domain were to be determined, new "non-traditional" types of data gathering would have to be employed. The many limitations of traditional comprehension tests has been well documented. To compensate for those shortcomings, three techniques designed to analyze reading comprehensions were adapted to obtain data concerning the effects of this study (Kintsch, W. & van Dijk, F.A., 1978)

1. A non-traditional technique for gathering data about individual perceptions gave the subjects an opportunity to retell in their own words everything they remembered about the slide + tape presentation they had just seen. This technique was employed again five weeks later in an attempt to gather information concerning the student's longterm response to both the topic and the presentation. The resulting data were analyzed by comparing the student responses to a macrostructure of the text.

2. Open ended essay questions, one on the pretest and one on the posttest, were also used to provide additional data about the students' attitude toward the topic of the presentation. The essay questions were used to determine if the students' opinions had changed following

the presentation. Each essay was independently rated by two experts, each indicating whether or not there was a change in the students' expressed beliefs from pretest to posttest.

3. Still, not everything needed could be measured. Thus, a unique eclectic procedure was devised: A questionnaire was constructed that used the most useful features of both the semantic differential and of the Likert scaling techniques. Unlike a simple semantic differential scale used to measure the students' attitudes toward a given topic, the second set of scales was designed to measure the students' attitudes toward the method of presentation.

Both the traditional and non-traditional data yielded interesting results. Each method confirmed and placed into doubt the results of the other type. That is, many of the same results were obtained by each of the two types, while opposing results were found depending upon which of the two types was examined. Detailed statistical and descriptive analysis of the results of this study are reported elsewhere (Beauchamp, 1988).

Conclusions

1. The future of affective domain studies will require new instruments and innovative techniques if accurate results are to be obtained. Educators, especially those interested in the affective domain, should work to devise new instruments that will attempt to examine those areas of visual and affective domain learning that have yet to be exhausted.

2. Ultimately, the study of the interaction of the more asethetically appealing examples of visuals and sounds (art and music, for example) may be the key to understanding human response (including learning) in the affective domain.

3. Inquiring into the role (and interaction) of visuals continues to be a most fruitful approach to the study of the affective domain.

References

Beauchamp, D.G. (1988). The effects of slide + tape presentation type on affective response and cognitive achievement. Unpublished doctoral dissertation, East Texas State University, Commerce, Texas.

Braden, R.A. & Beauchamp, D.G. (1987). Catering to the visual audience: A reverse design process. In R.A. Braden, D.G. Beauchamp, and L.W. Miller (Eds.), *Visible and viable: The role of images in instruction and communication*. Commerce, TX: International Visual Literacy Association, Inc.

Kintsch, W. & van Dijk, F.A. (1978). Toward a model for text comprehension and production. *Psychology Review, 85*, pp. 363-394.

Hypertext and Elaboration Theory: Use of Visual Epitomes for Learning Complex, Multi-Topic Material

Randall H. Rezabek and Tillman J. Ragan

Introduction

The rapid development of microcomputer technology continues at a breakneck pace. Every month new developments in both hardware and software present opportunities and challenges to the innovative educator. The opportunity is to harness and utilize this new technology to foster student learning, and the challenge is to do it in a manner consistent with the theory and practice of instruction.

In this paper we will present a new software concept called "hypertext", just now becoming available on a commercial basis for microcomputers. The capabilities of hypertext can be used to deliver instruction based upon the "elaboration theory", giving us the theoretical basis for the design of hypertext courseware. In addition we will introduce the idea of a visual epitome, which, based upon the principles of visual literacy, will allow students to quickly grasp the major ideas and relationships which compose a subject.

A Short History of Hypermedia

Hypermedia is a software system that links hierarchical levels of information together in an orderly, but nonsequential manner. The system connects ideas and references by directing readers to other documents, and utilizes electronic links for reaching the referenced information quickly and easily. Readers can create pathways through the linked documents which are cross-referenced and annotated. The system's documents can consist of text files, pictures, numerical data, computer graphics, music and video (Young, 1986).

The concept of hypermedia was developed from research in the 1960's by Douglas Engelbart and Ted Nelson. In 1962 Engelbart outlined the idea in a paper which proposed a set of software tools that would allow the development of an entirely original method of organizing and retrieving computer information.

The idea was eventually developed into an office automation project called *Augment*, developed by SRI International and sold to the U.S. government. The system, which runs on several mainframes, is still in use by the Air Force to write documentation for complex technical systems. One of the chief advantages of *Augment* is its use of "viewing filters" which lets the reader selectively control the scope, content, and format of information displayed on the screen.

The other development along this concept was the *Xanadu* system developed by Ted Nelson. Nelson calls his system "hypertext", which allows readers to browse randomly and create new documents by combining fragments of existing ones. Like hypermedia, hypertext can include sound, pictures, and other types of information. *Xanadu* uses a unified data pool of all the documents that reside in the system and uses an elaborate algorithm for organizing the layers of text and indexing the enormous number of links that are necessary in the functioning of the system.

It is obvious that such an elaborate system of hierarchically linked documents, which can expand to reveal additional layers of information, would be useful in an instruction context. Indeed, hypermedia is a growing area of research at universities such as Brown, MIT, Stanford, and Carnegie-Mellon (Young, 1986).

Recent advances in microcomputer technology, in both hardware and software are lowering the costs of hypermedia development. A hypertext program called GUIDE from OWL International was recently released for the Macintosh computer. GUIDE resembles a traditional page of print, but the use of its hidden "buttons" within the text allows the designer to utilize sophisticated levels of elaborated information which can be called up by the user. These "buttons", when selected, will open a hidden layer of text or graphics to link the reader to other documents or references (Shapiro 1987). GUIDE utilizes a number of different types of buttons. A replacement button replaces a section of a screen with something else. A reference button jumps you to a reference point somewhere else in your document or to another document entirely. The third type of button is called a note button, it opens a window containing additional data (such as a footnote or a definition of a word or phrase). Buttons can not only be text but can also be graphics, which can be imported into the document from external programs such as *MacPaint*..

The chief drawback for GUIDE is that readers may easily get "lost" in a document, that is lose their orientation to the original document. Hypertext authors should be careful in their design and attempt to incorporate some mechanism that would identify a reader's location in the document.

A second hypermedia product to be recently released for the Macintosh is called *HyperCard*, written by Bill Atkinson and sold through Apple. *HyperCard* takes a different approach than GUIDE, it more closely resembles a very flexible and powerful relational data base than a page of print. *HyperCard* uses the idea of "cards" as a metaphor. Each card is a screenfull of information which can be incorporated into a "stack", a collection of cards. *HyperCard* allows you to link various cards together by utilizing buttons (Goodman, 1987).

In addition to these hypermedia features, *HyperCard* has additional capabilities. A powerful graphics/paint program is built in, which allows an author to construct graphic interfaces, pictures and diagrams for each card. A search capability, called a "find string" allows the user to type in a phrase or word, and the program will automatically search through all cards in the stack and display each card that contains a reference to the selected phrase. *HyperCard's* most powerful feature is a programming language called *HyperTalk* . *HyperTalk* is an "English based" language which is relatively easy to learn and to use. It allows a *HyperCard* author to program a potentially limitless flexibility into the cards and stacks. For example, CAI-like question and feedback functions can be programmed into individual cards. Such things as graphic animation, sound generation and simulations can be built into the stacks. *HyperTalk* will also allow stacks to be linked to interactive video and CD-ROM databases.

Elaboration Theory: A Design Tool

It is apparent that hypermedia programs will link the microcomputer to huge amounts and types of information. But to be useful for instructional purposes this information must be structured in some manner that will insure that learning will take place and that students will not become overwhelmed with the information.

In other words, the main problem is an instructional design problem.

A new and promising approach to the design of instruction can be found in "elaboration theory." The elaboration theory, developed by Charles M. Reigeluth, is an attempt to integrate much of the piecemeal knowledge we have about sequencing instruction on the macro level (that is, sequencing instruction across a number of objectives). It is an alternative to the standard method of organizing instruction based on a hierarchical task analysis and resulting learner prerequisites (Reigeluth 1979, Reigeluth, Merrill and others, 1980). As its name implies, elaboration theory is concerned with designing levels of instructional information which will link in an "elaborated" relationship. Thus, hypermedia and elaboration theory utilize the same basic concept as a basis for organization: elaboration theory provides us with the prescription of what to do in the organization of content and hypermedia provides us with the means for how to deliver it. In other words, hypermedia would appear to be an ideal vehicle for the delivery of instruction, and elaboration theory can spell out the design specifications that are necessary to make that mass of information instructionally effective.

The overall approach of elaboration theory utilizes a general-to-detailed sequence of instruction, that is the concept of teaching ideas initially in a greatly simplified yet "intellectually honest" form, then periodically cycling back to teach those same ideas in more complex and complete forms. As a simple example, to teach students about the topic, "the forest", you would first present them with an overview epitomizing what a forest is, containing all of its elements in a simplified view. Next you would concentrate on one element of the forest, a tree (this is known as the first level of elaboration). Once the concept of "tree" and its subcomponents has been learned you would move onto a deeper level of understanding on a particular aspect of a tree, for example its leaf (the second level of elaboration). In turn a deeper level of study of the leaf is introduced and so on until an appropriate level of instruction is concluded (appropriate lower levels of elaboration). Periodically, you would relate the current level of instruction back to the overview of the forest to remind the student of the relationship of the part to the whole.

In order to accomplish this task, elaboration theory uses seven main strategy components. As stated above, a *general-to-detailed elaboration sequence* provides for the overall framework of the instruction. *Learning prerequisites* are introduced when necessary at the appropriate level of instruction, and are usually dependent upon the prior knowledge of the student.

At each level of elaboration a *summarizer* is utilized to systematically review what has been learned. In addition, a *synthesizer* is introduced which periodically attempts to interrelate and integrate the individual ideas taught at that level to the whole. Reigeluth also advocates the use of *analogies* to make understanding new ideas easier by relating them to familiar ideas. The instruction should encourage the use of *cognitive-strategy activators* to encourage students to use their generic learning and thinking skills. Finally, elaboration theory allows for the use of *learner control*, which refers, in its widest sense, to the freedom the learner has to take command of the selection and sequencing of the content, rate, instructional components and cognitive strategies used in the instruction. The degree of control a learner exerts over instruction usually depends upon a number of factors, such as prior learning, student maturity and self discipline, and the nature of the subject matter itself (Reigeluth and Stein, 1983). A great amount of learner control is built into elaboration theory. Students can choose to approach the instruction horizontally, that is by viewing each topic in the epitome before progressing onto the first level of elaboration, or they can view the instruction vertically, the first topic in the epitome is viewed, then the topic's first level of elaboration is mastered, followed by the second level of elaboration and so on until all levels are completed.

In addition, the concept of an epitome is vital to the understanding of elaboration theory. An epitome is a special kind of overview or advanced organizer which is designed to epitomize the subject matter of the course to be taught rather than summarize it (Reigeluth, Merrill & others, 1980; Reigeluth, 1979). The epitome is formed by "boiling down" the course content to its essence. It portrays only the most important aspects of the course content at an application level and utilizes lots of examples, generalities and practices to illustrate it.

The other important characteristic of an epitome is that it has a single "orientation", that is it emphasizes a single type of content, either concepts, procedures, or principles. The orientation is selected on the basis of the general goals or purposes of the course, the other two types of content may be introduced but only in a supporting role for the orientation content (Reigeluth and Stein, 1983).

Therefore, an epitome must be always either a very general or very simple representation of course content, but it should never be abstract. Reigeluth recommends, as a rough guide, that the epitome contain three to nine topics (generalities) along with some instances and practice items for each (1979). After the introduction of the epitome, "...the instruction proceeds to add detail or complexity in layers across the entire breath of the course content, one layer at a time, until the desired level of detail or complexity is reached." (Reigeluth and Garfield, 1984).

In the development of elaboration theory much "new" knowledge was generated, including strategies and prescriptive principles of instruction (Reigeluth and Rogers, 1980). But elaboration theory is also based upon a wide variety of established theories of learning and instruction. Assimilation theory, schema theory, Bruner's spiral curriculum theory (1960,1966) and Norman's web-learning theory (1973) all contributed to elaboration theory's overall approach. The idea of the epitome also grew out of these theories, especially the work by Ausubel (1968) on assimilation theory and the emphasis on overviews, although the specifications of Reigeluth's "special kind of overview" seem to be original. Reigeluth's recommendations on the use of analogies to assist learners in integrating new, highly unfamiliar content meaningfully are supported by the work of Ortony (1975) and Paivio (1979). The use of learning prerequisites dates back to the landmark work of Gagné (1977), although Reigeluth advocates a somewhat different approach in utilizing prerequisites. In elaboration theory, prerequisites are introduced at the appropriate level of instruction and only when necessary. Gagné recommends structuring the entire instructional strategy around prerequisites.

Variations on the model also need to be kept in mind when designing instruction. Reigeluth and Stein (1983) outlined three variations on the elaboration theory model: (1) a learner controlled model, which is the general model outlined in the literature; (2) a system-controlled model in which a teacher or other delivery medium uses information about each learner to select and sequence the content and strategy components; and (3) a fixed model which uses one set of content, sequence and strategy components for all students. There can be several types of fixed models. Elaboration theory hypothesizes that the learner controlled model should be used whenever possible, as long as the learners are properly instructed in the effective use of learner control. Information gathered in the study of learner characteristics and learner control can also be utilized in deciding which variation of the model to use under certain conditions.

The Visual Epitome: A Link for Hypermedia and Elaboration Theory

One of the major limitations of designing elaboration based instruction on a microcomputer is the representation of the epitome within the confines of a video screen. An unstated assumption of the idea of an epitome is that it can be grasped by a student rather quickly and in a single sitting. Its "conceptual distance" would be rather narrow, allowing users to view the breath of instruction at one time. In a classroom situation the instructor can present a demonstration to illustrate the major aspects of a course. For example, in a course on photography the instructor could expose, develop and print a roll of film in one quick session. A film or videotape of a physics course could quickly illustrate the process of conducting a scientific experiment. Print media often uses charts, graphs or illustrations to outline the content to be taught. Hypermedia can also adopt such a strategy by the use of what we call a "visual epitome".

A visual epitome can be thought of as an epitome of the epitome. That is, it is not meant to replace the epitome, but to merely represent it within the confines of a single screen of computer information. To accomplish this task we should keep in mind the principles of visual literacy and the capabilities of hypermedia.

A visual epitome should function as a conceptual map of the instruction, representing the major concepts, principles or procedures of the instruction and the relationships between them. For example, a flow chart could be used to represent a procedure, or graphic icons (similar to those already used in all Macintosh software) could be devised to represent concepts or principles. These conceptual maps could then be programmed to be interactive, clicking on the flowchart or an icon would bring up information from the more formal epitome that would define and explain the selected aspects of the instruction. The student could then choose to go vertically into the first level of elaboration or continue horizontally and view other aspects of the epitome. Visual epitomes can also be programmed to indicate which parts of the instruction have already been successfully mastered by the student. Thus the "visual epitome" can function as a gatekeeper, channeling the learner's effort into the appropriate aspect of the instruction.

Conclusion

Hypermedia is a powerful new technique for linking concepts, principles and procedures into complex and sophisticated relationships. But experience in educational technology has taught us that the power of a new medium alone will not guarantee instructional effectiveness. Good instructional design is the key to the proper use of instructional media. This paper recommends that elaboration theory provides an appropriate framework for designing instructional hypermedia products. But in order to take advantage of the strengths, while attempting to overcome the weakness of hypermedia, it may be helpful to employ visual epitomes to help learners visualize the scope and content of the instruction while guiding their efforts. In addition, hypermedia can provide a valuable research tool for investigating the role and effectiveness of epitomes in elaborated instructional designs.

References

Ausubel, D.P. (1968). Educational psychology: A cognitive view. New York: Holt, Rinehart & Winston.

Bruner, J.S. (1960). The process of education. New York: Vintage Books.

Bruner, J.S. (1966). Toward a theory of instruction. New York: W.W. Norton & Co.

Gagné, R.M. (1977). The conditions of learning (3rd ed.). New York: Holt, Rinehart & Winston.

Goodman, D. (1987). The complete HyperCard handbook. New York: Bantam Books.

Norman, D.A. (1973). Memory, knowledge, and answering of questions. In R.L. Solso (Ed.), Contemporary issues in cognitive psychology: The Loyola symposium. Washington, D.C.: Winston.

Ortony, A. (1975). Why metaphors are necessary and not just nice. Educational Theory, 25, 45-54.

Paivio, A. (1979). Imagery and verbal processes. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Reigeluth, C.M. (1979). In search of a better way to organize instruction: The elaboration theory. Journal of Instructional Development, 2(3), 8-15.

Reigeluth, C.M. & Garfield, J.M. (1984). Using videodiscs in instruction: Realizing their potential through instructional design. Videodisc and Optical Disc, 4(3), 199-215,

Reigeluth, C.M., Merrill, M.D., & others. (1980). The elaboration theory of instruction: A model for sequencing and synthesizing instruction. Instructional Science, 9(3), 195-219.

Reigeluth, C.M. & Rogers, C.A. (1980). The elaboration theory of instruction: Prescriptions for task analysis and design. NSPI Journal, 19(1), 16-26.

Reigeluth, C.M. & Stein, F.S. (1983). The elaboration theory of instruction. In C.M. Reigeluth (Ed.), Instructional-design theories and models: An overview of their status. Hillsdale, N.J.: Lawrence Erlbaum & Associates.

Shapiro, E. (1987, April). Another Odd Lot. Byte, pp. 301-302.

Young, J.S. (1986, March) Hypermedia. MacWorld, pp. 116-121.

An Agenda for Conducting Research on Visual Intelligence Training

Ronald J. Aust and Robert G. Harrington

Defining Intelligence

Over the past eight decades, one of the greatest contributions to the field of psychology has been the intelligence quotient (IQ) test. At the same time, one of the greatest controversies in psychology has centered on defining what intelligence is and how psychologists studying psychometrics should go about designing and validating instruments to measure intelligence. Thus, we are left with the dilemma of applying IQ tests which have not been designed according to a single, clearly explicated definition of intelligence. In fact, some frustrated theorist have resorted to the reified definition that "intelligence is whatever intelligence tests measure." Obviously, this so-called definition of intelligence is a circular one and is of little use in advancing theory. To better understand the enduring confusion over how intelligence should be defined, consider that in 1921 thirteen nationally recognized researchers on intelligence convened at the national conference of the *American Psychological Association* to discuss their definitions of intelligence. At the conference each researcher gave a different viewpoint about the nature of intelligence. Unfortunately, the confusion exemplified at the conference in 1921 continues and there is currently no consensus on a definition for intelligence.

Despite these failed attempts at defining intelligence, others have offered alternative strategies for understanding the nature of intelligence. These theorists have said that a good intelligence test should predict important outcome variables such as high academic achievement or possibly vocational success. This approach rests upon the predictive validity of the IQ test. Once again, however, the psychometric approach to defining intelligence has revealed little about what the underlying components of intelligence are. For these theorists, intelligence represents only a correlation between IQ test results and certain test predictions that they would like to make, such as how well a student will do in school. In other words, intelligent behavior is inferred because the IQ test seems to predict certain future academic or vocational successes that seem to require higher levels of cognitive abilities.

A Multidimensional View of Intelligence

The approaches to defining intelligence described up to this point depict intelligence as a unidimensional construct. They imply that there is only one form of intellectual ability that is best described as academic intelligence. In order to deal with the criticism that intelligence is not a unidimensional but rather a multidimensional phenomenon, Guilford (1967) has proposed a model that is based on the assumption that there are many different forms of intelligence. We see these many forms of intelligence manifested not only in success at traditional academic pursuits but also when someone is a successful artist, a successful leader with little education, or a gifted auto mechanic with little or no formal training. Guilford's structural model of intellectual functioning contains no less than 120 different forms of intelligence. He argues that different combinations of intellectual skills are utilized in performing different tasks and no single form of intelligence can be used to explain how individuals solve different types of problems. This theory has some intrinsic appeal in our attempts to understand intelligence in all its many forms. While standardized intelligence tests tend to be verbally loaded in content, (even when some of their subtests have been specifically designed to assess certain aspects of visual intellectual abilities) the Guilford model of intelligence holds the promise of recognizing visual intelligence, among other forms of intelligence, in its purest forms.

Despite the improved clarity and organization that the Guilford model brings to our understanding of intelligence in all its myriad forms, Eysenck (1973) has criticized this model because he claims that it fails to recognize the fact that all of these 120 supposedly different forms of intelligence seem to correlate. Eysenck has inferred that there is one underlying feature or general form of intelligence that all of the forms of intelligence contained in the Guilford model have in common. Further, Eysenck has criticized the Guilford model for not taking into consideration the hierarchical nature of intelligence that most theoreticians seem to have agreed upon. Examples of early proponents of the hierarchical approach to understanding intelligence include Spearman, Thorndike and Thurstone.

In sum, there are currently no firm conclusions about what intelligence is. What seems to be clear is that there are probably many different forms of intelligence that are related to each other under the notion of general intelligence. Furthermore, all currently used intelligence tests seem to include measures of intelligence that most would refer to as visual intelligence.

Visual Intelligence as Measured on Current IQ Tests

Two of the major intelligence tests in use today, the *Wechsler Intelligence Scale for Children-Revised* and the *Stanford-Binet Intelligence Scale IV* have been based upon what is called a general *G* form of intelligence. What is meant by a general *G* form of intelligence is that intelligence should be viewed as a global or a general construct. Authors of these forms of intelligence tests consider intelligence to be a part of the larger whole of personality itself. However, no attempt has been made to design a series of subtests as part of these IQ tests to directly measure *primary abilities* (the basic units that make up general mental ability or order the subtests into a hierarchy of relative importance). In other words, while these IQ tests seem to include several subtests that tap a variety of mental abilities, the intellectual construct of visual intelligence is never measured directly. Instead, the overall IQ obtained from the scale is intended to represent the best index of general mental ability. Because the *Wechsler* series and the *Stanford-Binet IV* are intended to be general measures of overall intelligence, test examiners are usually encouraged to consider the full scale IQ achieved on either test as the best predictor of general mental abilities. There are, however, a number of subtests contained on both of these intelligence tests. Typically, these subtests fall into two primary categories designed to measure either verbal or visual/perceptual ability. An example of verbal tests contained on the *WISC-R* is the Verbal Scale. This scale contains six verbal subtests each measuring some aspect of verbal intelligence.

The performance scale on the *WISC-R* represents the five subtests that best relate to visual intelligence. Examples of *WISC-R* subtests requiring special visual intellectual skills include subtests called Picture Completion, Picture Arrangement, Block Design, Coding, and Object Assembly. For example, in the Block Design subtest, the child is shown two-dimensional, red-and-white pictures of abstract designs. The task requires using blocks to assemble a design that is identical to the design on each picture. The child is required to reproduce the designs from a model constructed by the examiner for the first two items. For the remaining nine items, the patterns are shown on cards. Two-color (red and white) plastic blocks are used. The patterns are arranged in order of increasing difficulty. Four blocks are arranged in order of increasing difficulty. Four blocks are used for the first eight designs, and nine blocks are used for the last three designs. All of the items are timed. Block design involves the ability to perceive and analyze forms by breaking down a whole (the design) into its component parts and then assembling the component parts into the identical design, a process referred to as analysis and synthesis. The subtest combines visual organization with reproductive aspects of visual-motor coordination. Success involves the application of logic and reasoning to spatial relationship problems. Consequently, Block Design can be conceived of as a nonverbal concept formation task requiring abilities in perceptual organization, spatial visualization, and abstract conceptualization. Likewise the *Stanford-Binet IV* (with its Paper Cutting and Form Board Tasks for example), and the *Kaufman Assessment Battery for Children (K-ABC)* (with its Magic Window and Spatial Memory subtests) have subtests that represent such visual perceptual forms of intellectual abilities.

Attempts at Increasing Visual Intelligence

What is interesting to note is that while the full scale scores (otherwise known as measures of general *G* intelligence) obtained on these measures are typically used in placement decisions for special education and other remedial assistance, it is a regular practice of school psychologists to interpret not only the subscales of these tests but also the subtests contained on these scales. The purpose of this interpretive process has been for the school psychologist to detect the areas of cognitive weakness and strength. With this information in hand, the psychologist is better able to plan a program of remediation which attempts to enhance the child's assessed intellectual strengths and improves upon the child's intellectual weaknesses. Many texts have been written in this regard. One of the most famous texts describing this interpretive process is Kaufman's Intelligent Testing with the *WISC-R* (Kaufman & Kaufman, 1977). Once this interpretive information is derived, the task of the school psychologist has been to develop remedial programs to help the child learn whatever the subject matter might be, such as reading, spelling, or arithmetic, using his/her cognitive strengths and when possible remediating cognitive weaknesses. Typically, the emphasis of such remedial programs has been to improve academic functioning only. No attempt has been made to improve intellectual functioning directly. In other words, it has been assumed that intelligence is a static quality and not easily changed or improved. Furthermore it has been assumed that intelligence is a stable entity that is very useful in predicting long-term academic performance only. In fact, some researchers have made claims that intelligence is determined primarily by genetic make-up and that the environment has a very small influence. In this regard Arthur Jensen (1980) has stated that based upon his heritability estimates, he believes that intelligence is 80% determined by genetic background and that environment accounts for only 20% of the variability in intellectual ability. Some researchers and practitioners have interpreted Jensen to mean that, in fact, intelligence is relatively immutable and that basically a subject's intellectual capacity is determined primarily at birth. This is a rather fatalistic approach to understanding intelligence because it assumes that any attempt to modify intelligence directly will probably be met with limited success.

Recently, an Israeli psychologist named Reuven Feuerstein (1979) has conducted some research on mentally handicapped school-age children and has shown that intelligence may not be as unchangeable as once thought. In some cases he has shown test-retest results in which he has been successful in raising children's measured IQ scores by 20 points or more. These are statistically significant increases. His method of uncovering intellectual deficiencies is called the *Learning Potential Assessment Device (LPAD)* and his method of remediating these deficits is called Instrumental Enrichment. Feuerstein prefers to call his young subjects retarded performers rather than mentally retarded. He makes this distinction because he does not believe that these children should be considered retarded for life; instead it is only their performance that is retarded. Further, he believes that a part of what these children are lacking is not intelligence but training. He claims that these children have never been taught to think, to solve problems, to recognize a problem, to check a problem, or to organize their problem solving. What Feuerstein has attempted to do with his Learning Performance Assessment Device is to identify what these children's cognitive deficits are. Feuerstein believes that cognitive deficits may occur at the input, processing, or output phases of problem solving. Using the traditional approach to intelligence testing, the examiner assesses the child with an IQ test and then compares that child's performance with other children's performance of his/her own age and then classifies that performance as being in the retarded range or not. Using Feuerstein's *LPAD* approach the task of the examiner is to present certain tasks to the child and then to carefully observe how he/she attempts to solve the problems. Next, the examiner teaches the child how to perform the task by conducting a dialogue with the child in which the examiner slowly leads the child through each stage of the problem-solving process and helps him/her recognize all the steps in the process. Eventually, the child is able to perform the task on his/her own and should be able to perform similar tasks without the aid of the examiner. At that point, the examiner retests the child with the original tasks to evaluate whether the improvement in performance has been maintained and generalized.

What is most interesting about the *LPAD* and instrumental enrichment is that these new thinking skills seem to result in increases in intelligence scores without any direct teaching to an intelligence test. In other words, Feuerstein would say that intelligence, (as we measure it with standardized intelligence tests such as the *Stanford-Binet IV* or *WISC-R*) is not immutable. It can be changed and improved.

Other researchers have provided further substantiation and support for Feuerstein's hypothesis that certain aspects of intelligent behavior can be taught and thus have the potential for improvement. Alan Kaufman (1983), for example, has developed the *Kaufman Assessment Battery for Children (K-ABC)* which is based upon a neurological model of intellectual functioning. The model assumes that all cognitive processing is either simultaneous or sequential. Sequential processing is assumed to involve linear forms of information processing, whereas simultaneous processing suggests that multiple forms of information are considered at once in solving problems. Once the subject has completed the *K-ABC*, intervention strategies are used to address cognitive deficits. The materials that Kaufman has developed to deal with these cognitive deficits is called *S-O-S*, referring to the *Simultaneous Or Sequential* processing involved in this model of intellectual remediation.

What Feuerstein's and Kaufman's intervention approaches share in common is a belief that current theories about the static nature of intelligence may not be completely accurate. Second, both theories assume that it may be possible to accurately identify and remediate cognitive deficits. Third, both theorists assume that intelligence is a multidimensional phenomenon and includes a variety of forms of visual intelligence. Fourth, both theorists assume that while it may be possible to remediate intellectual deficits, they both tend to use primarily verbal approaches in remediation, even when the deficit is visual in origin. For example, when an examiner identifies a visual processing deficit, the remedial plans typically require the examiner to use that same visual material and verbally explain where the examinee made the processing errors. This approach would appear to be incongruent with the notion of visual intelligence and a much better approach would be to use visual methods to train for visual forms of intelligence.

Media Comparison Studies: A Failed Agenda for Research

When considering a research agenda which may lead to instructional strategies for addressing visual intelligence, it is worth noting some previous research approaches which have not been fruitful. Much of the the early instructional media research was concerned with comparing the relative effectiveness of various types of media. After reviewing decades of instructional media studies and discovering no conclusive findings on which to base suggestions for practitioners, a number of investigators (Winn, 1987; Torkelson, 1977; Salomon & Clark, 1977) have recommended that we abandon the media comparisons approach to research.

Clark (1983) used an analogy which described media as merely the delivery vans of instruction. His point was that media do not determine how effective the instruction will be. They are simply carriers of information. If media carry well designed instruction, they are likely to be effective. Conversely, if media carry poorly designed instruction they will be ineffective. Although Clark's notion that the media make no instructional difference has its critics (Petkovich & Tennyson, 1984), there is broad acceptance for the assumption that the quality and characteristics of the instruction, carried by the media, play a significant role in determining instructional effectiveness.

Should Mental Processes Be Supplanted or Elicited?

As an alternative to the gross comparison studies, Salomon (1979, 1981) recommended that researchers consider the relationships between media attributes and mental processes. He believed that some visual processing skills could be modeled or supplanted by media attributes. For example, Salomon (1979) used the media attribute of zooming with a camera lens to supplant the mental zooming which *experts* use in attending to pictorial cues. Salomon found that the subjects who initially scored low in cue-attendance improved after instruction with the zooming technique, while the performance of those who initially scored high in cue-attendance decreased after instruction. He concluded that the zooming instruction apparently interfered with the existing mental strategies used by the learners who were more accomplished in attending to pictorial cues.

Salomon's discovery of an interaction between the zooming instruction and learner aptitudes underscores the need to reconsider the assumption that the mental processes of experts can be modeled by media attributes. Mental processes cannot be observed directly. They can only be inferred from the learner's performance. If the precise nature of the processes is not understood, it is not possible to replicate the processes with media attributes. Furthermore, as numerous aptitude- and trait-treatment interaction studies have found (DiVesta, 1975; Cronbach & Snow, 1977; Heidt, 1978), different mental processes can be used to accomplish the same tasks. If the instruction is designed to model a specific mental solution, it is unlikely that the process will be accommodated by all individuals given the diverse cognitive schemata which learners possess.

Instead of attempting to supplant specific mental processes we could assume that the seed of ingenuity resides within the learner. Under this assumption, instructional strategies should be designed to draw-out or elicit mental processes. This elicitation instructional approach is based on introverted theories of perception (Rock, 1983; Norberg, 1978; Neisser, 1976) which argue that the aspects of perception most crucial to learning involve the self-directed processes which individuals use to interpret external stimuli. These higher-order processes, characterized by the Gestalt principles of closure and proximity (Kohler, 1947; Wertheimer, 1923), may resemble cognitive processes used in manipulating memorial representations but because they occur in immediate conjunction with corresponding stimuli, they are considered perceptual.

Introverted theories also assume that there is a reciprocal interaction between perception and cognition where changes in perceptual abilities cause changes in cognitive abilities and changes in cognition in turn influence perception. Thus, if strategies are used to elicit higher-order perceptual abilities they may transfer to cognitive abilities through analogical reasoning (see Gick & Holyoak, 1983). However, before strategies for eliciting perceptual processes can be established, it is necessary to identify similar cognitive processes which have been validated as contributing to learning (Sternberg, 1983).

Similarities Between Perception and Visual Intelligence

Psychologists generally agree that the mental representation (percepts) developed during normal form perception are analogs of their referent proximal stimuli (see Brown and Deffenbacher, 1973). Analog mental representations can be likened to road maps. They possess isomorphic distance and direction relationships to their referents but they lack the fidelity of an aerial photograph. Instead, their schematic properties are dependent on the task at hand.

Researchers (Paivio, 1976; Bower, 1972) have found evidence that the mental representations formed during imagery also have analog properties. In a classic study of imagery, Shepard and Metzler (1971) found that the amount of time it took subjects to identify a rotated two-dimensional shape corresponded to the number of degrees the shape had been rotated. They conclude that this correspondence between response time and degree of rotation indicated that the subjects were mentally rotating analogs of the shape. These apparent similarities between the analog nature of the mental representations formed during imagery and perception have led a number of theorist to believe that the processes involved in constructing the mental representations are also similar (Finke, 1980; Kosslyn & Pomerantz, 1977; Shepard & Podgorny, 1978).

Imagery and Intellectual Development

The visual subtests of IQ include tasks, such as Block Design, which require the subject to imagine transformations of physical objects. They are based on the assumption, supported by Piaget (1966a, 1966b) that such abilities reflect general intellectual ability. Piaget believed that as children transcend from the preoperational (ages 2-7) to the concrete operational (ages 7-11) stage, their ability to imagine physical transformations improves markedly. Preoperational children are egocentric in their thinking. They have a subjective view of the world which causes them to center on specific aspects of object and events. Consequently, the images they produce are static reproductions of what they observe. As children move toward the concrete operational stages they become more objective in their thinking. They move their focus away from particular details (decenter) which allows them to more accurately predict changes which will occur in the external world. Thus, they begin to develop imagery skills to anticipate transformations which are required in solving several of the tasks in IQ tests.

Piaget and Inhelder's studies (1971), on the child's ability to conserve liquids, illustrates the acquisition of anticipatory imagery. When preoperational children were asked to predict how high a given volume of liquid will reach when poured from a wide to a narrow glass, they tended to center on the height aspect alone and predict that the liquid would reach just as high in the narrow glass as it was in the wide glass. On the other hand, the concrete operational children could predict the height the liquid would reach in the narrow glass because they mentally anticipated the transformation. They were able to decenter from the height aspect and begin to understand the relationship of height and width in the construct of volume.

Studies which relate imagery with intellectual development (Cooper & Shepard, 1973; Shepard & Feng, 1972) have also found that the ability to solve mental rotation and paper folding tasks continues to develop through adulthood. In a review of studies which used paired associate designs with verbal and pictorial items, Rower (1970) concluded that the ability to derive optimal benefit from verbal modes of representation developed to its full capacity earlier than the ability to derive optimal development from visual modes of representation. Others (Shepard, 1978; Hadamard, 1945) have reviewed the psycho-biographies of noted thinkers, such as Einstein and Maxwell, who claimed that the processes they used during the conception of many of their most significant discoveries required the construction and manipulation of highly abstract analog mental representations which they *saw* mentally. Such evidence suggests that the potential for addressing the intellectual development of imagery extends beyond the abilities which are assessed by the visual subtests in traditional measures of intelligence.

The Symbolic Systems of Visual and Verbal Modes of Representation.

A research agenda for investigating the potential of instructing for visual intelligence cannot be based entirely on assumption about the nature of mental processes. As previous media comparison studies have taught us, expectations of addressing mental processes by simply blanketing the learners with a barrage of media techniques are unrealistic. Instead, general guidelines are needed for relating the salient aspects of the symbol systems which the media carry to the mental processes affiliated with intellectual development (see Salomon, 1979; Olson & Bruner, 1974).

The visual literacy movement has been criticized for placing too much emphasis on metaphorical comparisons between visual and verbal modes of communication (Cassidy & Knowlton, 1983; Cochran, Younghouse, Sorflaten, & Moleck, 1980). Instructional implications based on extroverted theories of perception (Gibson, 1954; 1972) imply that the metaphor, *a picture is worth a thousand words* means that there is a natural language of vision embodied in the proximal stimuli which is automatically consumed by the viewer. While there is some truth to this notion (For example, humans almost always perceive the area between light and dark shapes as a line.), the idea that we might discover a set of rules which govern visual language in the same ways that they govern verbal language is unfounded. A more appropriate approach is to use a scheme for distinguishing the unique aspects of verbal and visual symbol systems. Moreover, this scheme should provide insights for determining ways of eliciting the self-directed perceptual processes which people use in interpreting information.

Salomon (1979) recommended that instructional media researchers consider Goodman's (1968) scheme for classifying symbol systems according to their degree of notationality. Goodman claimed that notational symbol systems are syntactically finite and character indifferent. That is, a notational system contains a limited number of codes and each individual code cannot represent or be represented by any other code in the system. The symbol systems used in verbal, musical, mathematical, and computer languages are examples of notational systems although they vary in their degree of notationality. Notational symbol systems are also characterized by specified rules of syntax which have been arbitrarily imposed by society.

On the other hand, non-notational symbol systems, such as the iconic mediums of pictures or video, have the qualities of syntactical density and character difference. Non-notational systems are replete with symbols. They possess an infinite number of codes so ordered that between any two codes, a third code can exists which is not specifically connected to any other code. A distinct advantages of using a non-notational system in addressing mental processes is that the instructional possibilities are not as closely bound by the conventional rules of coding or syntax. Once valid processes are identified, there is more freedom to design strategies to elicit the targeted processes. Non- notational symbols can be more readily used to address higher-order processes at the perceptual level because the symbols tend to be isomorphic to their referents. If the processes require the manipulation of analog mental representation, the learner is not left with the added burden of connecting the arbitrary codes and syntax of a notational systems to the internal analogs they represent.

An Agenda for Research

We have reviewed several assumptions which can be used to guide research concerned with training for visual intelligence. The concept of visual intelligence has been to a large degree defined by the mental processes required in solving the tasks found in the visual subtests of IQ. While IQ tests have their limitations, they haven proved to be solid predictors of achievement in schools. Of course, a conception of visual intelligence could extend beyond the processes required in solving the tasks in IQ tests to include the abstract analog processes which noted thinkers have claimed they use when conceptualizing ideas.

Research has indicated that some intellectual visual skills are trainable. And yet, schools continue to adopt instructional strategies which are based almost exclusively on communicating with verbal and mathematical symbol systems. The success of these strategies is then assessed with reasoning tests which are greatly dependent upon abilities to manipulate and construct analog mental representations. It is time to expand our theoretical horizons and begin to investigate the potential of using instructional strategies which employ a greater proportion of non-notational symbol systems in addressing analog processes which contribute to general intelligence.

Instructional strategies for visual intelligence should be based on the assumption that learners are actively involved in constructing meanings form visual stimuli. Each learner brings a unique set of processes to the interpretation of stimuli. Consequently, the instructional strategies should be designed to elicit or direct processes as opposed to supplanting specific processes which may not fit the learner's cognitive schemata. Instructional strategies which are designed to elicit higher-order perceptual processes may be especially effective because the processing must occur in direct conjunction with the proximal stimuli. Once the higher-order perceptual processes are elicited, they may transfer to related imagery processes through analogical reasoning.

Finally, the research approach should address valid cognitive processes (Butterfield, Silida & Belmont, 1980; Belmont and Butterfield, 1977). Evidence should be provided which indicates that the targeted processes improve with age or instruction. If such evidence is not conclusive, studies should be conducted to establish the validity of the identified processes.

330

A prototype for eliciting processes required in solving the previously mentioned Block Design task is provided below. The imagery requirements to solve the Block Design task are somewhat similar to those required in other visual subtests such as *Magic Window* and *Triangles* found in the *KABC*. However, some visual subtest, such as *Matrix Analogies* and *Photo Series* are more semantically oriented and thus would require a different strategy. The Block Design instructional prototype has not been confirmed but it represents a beginning step in considering how the previously mentioned assumptions could be applied to training for visual intelligence.

Perceptual Training for the Block Design Task

The Block Design tasks requires imagery processes for mentally rotating the blocks in creating a match to a composite model. Similar transformational processes can be elicited at the perceptual level using a procedure in which figures are passed behind a narrow stationary slit. The ability to recognize whole figures from this type of display is known as anorthoscopic (abnormally viewed) perception. Because the whole figures are never seen, except as revealed through the slit, the perceiver must devise a hypothesis- forming mechanism for mentally constructing the whole percept of the figure. A recent developmental study of anorthoscopic perception (Aust, 1984) found that the ability to recognize whole figure from an anorthoscopic display follows a developmental trend similar to the development of Piagetian operations of intelligence. This study, also found a significant interaction between developmental level and figure familiarity which indicated that preoperational children benefited more from the anorthoscopic presentation of a familiar figure than did either the concrete operational children or the adults.

When a moving target is introduced in an anorthoscopic display and the speed of the figure moving behind the slit remains constant, the perceived length of the constructed percept increases with increases in target speed and decreases with decreases in target speed (Aust, 1984; Rock, 1983). Thus, hypothesis-forming mechanisms can be influenced at the perceptual level to manipulate analog mental representations in an orderly manner. While the processing requirements are not identical to those used in rotating analog representations, these perceptual level processes may serve to prompt the higher-order imagery skills needed to solve the Block Design task.

Instruction could begin with a gaming strategy in which simple familiar figures are anorthoscopically displayed through a wide slit and the child is asked to identify the corresponding whole figures. As the child becomes accomplished in recognizing the familiar figures through the wide slit, the width of the slit is progressively decreased. The complexity of the figures is also increased as the child acquires competence. Similar strategies of moving to progressively more challenging displays could then be applied using the moving target anorthoscopic display.

Once the the constructive processes have been elicited at the perceptual level they could be followed with computer games, such as *The Factory* or *Gertrude's Puzzles*, that require the mental rotation of two-dimensional images. These games involve imagery processes similar to those needed to solve the Block Design task, but the sequential steps in solving the problem are often specified during the task presentation. Finally, instruction with fewer sequential specifications, would lead to the development of metaprocessing skills used to select and direct the imagery processes required for solving some of the more challenging tasks which exemplify visual intelligence.

References

Aust, R. J. (1984). *Mental processes involved in anorthoscopic perception.* Doctoral dissertation, University of Washington, Seattle.

Belmont, J. M., & Butterfield, E. C. (1977). The instructional approach to developmental cognitive research. In R. E. Kail & J. W. Hagen (Eds.), *Perspectives on the development of memory and cognition.* Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Bower, G. H. (1972). Mental imagery and associative learning. In L. W. Gregg (Ed.), *Cognition in learning and memory.* New York: Wiley.

Brown, E. L., & Deffenbacher, K. (1973). *Perception and the senses.* New York: Norton.

Budoff, M., Meskin, J. & Harrison, R.H. (1971). Educational test of the learning-potential hypothesis. *American Journal of Mental Deficiency,* 76, 159-169.

Butterfield, E. C., Slida, D., & Belmont, J. M. (1980). Validating, theories of intelligence. In H. Reese, & L. P. Lypsett (Eds.) *Advances in child development and child behavior (Vol. 15).* New York: Academic Press.

Cassidy, M. F., & Knowlton, J. Q. (1983). Visual literacy: A failed metaphor? *Educational Communications and Technology,* 31, 67-90.

Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research,* 53, 445-459.

Cochran, L. M., Younghouse, P.C., Sorflaten, J. W., & Moleck, R. A. (1980). Exploring approaches to researching visual literacy. *Educational Communications and Technology,* 28, 243-266.

Cooper, L. A., & Shepard, R. N. (1970). Transformations on representations of objects in space. In E. C. Corterette, & M. Griedman (Eds.) *Handbook of perception, (Vol. 8).* New York: Academic Press.

Cronbach, L. J., & Snow, R. E. (1977). *Aptitudes and instructional methods.* New York: Irvington.

De[illegible]an, D. K., & Sternberg, R. J. (1982). (Eds.) *How and how much can intelligence be increased?* Norwood, NJ: Abley.

DiVesta, F. J. (1975). Trait-treatment interactions, cognitive processes, and research on communication media. *AV Communication Review,* 23, 185-196.

Eysenck, H.J. (1973). *The measurement of intelligence.* Baltimore, Maryland: Williams &Willkens.

Feuerstein, R. (1979). *The dynamic assessment of retarded performers: The learning potential assessment device, theory, instruments and techniques.* Baltimore: University Park Press.

Finke, R. A. (1980). Levels of equivalence in memory and perception. *Psychological Review,* 25, 43-62.

Fleming M. L. (1987) Displays and Communication. In R. M. Gagne (Ed.), *Instructional technology: Foundations.* Hillsdale, New Jersey: Lawrence Erlbaum.

Gibson, J. J. (1954). A theory of pictorial perception. *AV Communication Review,* 2, 3-32.

Gibson, J. J. (1972). A theory of direct visual perception. In J. R. Royce & W. W. Rozenboom (Eds.), *The psychology of knowing.* New York: Gordon & Breach.

Gick, M. L. & Holyoak, K. J. (1983). Schema induction and analogical transfer. *Cognitive Psychology,* 12, 306-355.

Goodman, N. (1968). *Language of art.* Indianapolis: Bobbs-Merrill.

Gregory, R. L. (1977). *The intelligent eye.* New York: McGraw-Hill.

Guilford, J.P. (1967) *The nature of human intelligence.* New York: McGraw-Hill.

Hadamard, J. (1945). *The psychology of invention in the mathematical field.* Princeton, N.J.: Princeton University Press.

Heidt, E. U. (1978). *Instructional media and the individual learner.* New York: Nichols.

Jensen, A.R. (1980). *Bias in mental testing.* New York: The Free Press.

Kaufman, A. and Kaufman, N. (1983). *Kaufman Assessment Battery For Children.* Illinois: American Guidance Services.

Kaufman, A., and Kaufman, N. (1977). *Intelligent testing with the WISC-R.* New York: Wiley.

Koffka, K. (1935). *Principles of Gestalt psychology.* New York: Harcourt.

Kohler, W. (1947). *Gestalt psychology.* New York: Liveright.

Kosslyn, S. M., & Pomerantz, J. R. (1977). Imagery, propositions, and the form of internal representations. *Cognitive Psychology,* 9, 52-76.

Neisser, U. (1976). *Cognition and Reality.* San Francisco: Freeman.

Norberg, K. (1978). Perceptual research: Does it make any difference? *Educational Communications and Technology,* 26, 5-13.

Olson, D. R., & Bruner, J. S. (1974). Learning through experience and learning through media. In D. R. Olson (Ed.), *Media and symbols: The forms of expression, communication, and education.* (NSSE Yearbook). Chicago: University of Chicago Press.

Paivio, A. (1976). Images propositions and knowledge. In J. M. Nicholas (Ed.), *Images propositions and knowledge.* Dordrecht: Reidel.

Paivio, A. & Yuille, J. C. (1969). Changes in associative strategies and paired associate learning over trials as a function of word imagery and type of learning set. *Journal of Experimental Psychology,* 79, 458-463.

Petkovich, M., & Tennyson, R. (1984) Clark's learning from media: A Critique. *Educational Communications and Technology,* 32 (4), 233- 241.

Piaget, J. (1966a). *The mechanisms of perception.* New York: Basic Books.

Piaget, J. (1966b). *Genetic epistemology.* New York: Columbia University Press.

Piaget, J., & Inhelder, B. (1971). *Mental imagery in the child.* New York: Basic Books.

Rock, I. (1983). *The logic of perception.* Cambridge, Mass.: Bradford.

Rohwer, W. D., Jr. (1970). Images and pictures in children's learning: Research results an educational implications. *Psychological Bulletin,* 73, 393-403.

Salomon, G. (1979). *Interaction of media, cognition, and learning.* San Francisco: Josey Bass.

Salomon, G. (1981). *Communication and education: Social and psychological interactions.* Beverly Hills: Sage.

Salomon, G., & Clark, R. E. (1977). Reexamining the methodology of research on media and technology in education. *Review of Educational Research,* 47, 99-102.

Sattler, J. (1982). *Assessment of children's intelligence and special abilities.* New York: Allyn & Bacon.

Shepard, R. N. (1978). Externalization of images and the act of creation. In B. Randhawa & W. E. Coffman (Ed.), *Visual learning, thinking and communication,* New York: Academic Press.

Shepard, R. N., & Metzler, J. (1971). Mental rotation of three-dimensional objects. *Science,* 171, 701-703.

Shepard, R. N., & Podgorny, P. (1978). Cognitive processes that resemble perceptual processes. In W. K. Estes (Ed.), *Handbook of learning and cognitive processes (Vol. 5: Human information processing)* Hillsdale, N.J.: Lawrence Erlbaum Associates.

Sternberg, R. J. (Ed.) (1982). *Handbook of human intelligence.* New York: Cambridge University Press.

Sternberg, R. J. (1983). Criteria for intellectual skills training. *Educational Researcher,* 12 (2), 6-12.

Thorndike, D. Sattler, J. (1986). *Stanford-Binet IV.* New York: Riverside Publishing Co.

Torkelson, G. M. (1977). AVCR - one quarter century: Evolution of theory and research. *AV Communication Review*, 25, 317-358.

Wertheimer, M. (1958). *Principles of perceptual organization.* In D. C. Beardslee & M. Wertheimer (Eds. and Trans.), Readings in perception. Princeton: Van Nostrand. (Original work published, 1923).

Wechsler, D. (1974). *Wechsler Intelligence Scale For Children- Revised.* New York: Psychological Corporation.

Winn, W. (1987) Are media merely vehicles for Instruction? In M. R. Simonson & S. M. Zvacek (Eds.), *Proceedings of Selected Research Papers at the 1987 Annual Convention of the Association of Educational Communications and Technology*, (pp. 40-48). Ames, Iowa: Iowa State University Instructional Resources Center.

Identifying the Telecourse Student: Who She Is and What She Wants

LaVerne W. Miller

This paper is a report aimed at examining the current student population of the College of the Air of Montgomery College in Maryland as it may affect planning possible market strategies for increasing enrollments. Its target audience is those interested in television learning.

Montgomery College in Takoma Park participates in the Maryland College of the Air consortium of colleges who offer college credit via telecourses. The telecourse offerings are chosen by the consortium representatives (of which I am one) from each of the state's community colleges, the campuses of state colleges, and the state university. There is a highly-organized mechanism for selection by consensus from among the courses made available by the Public Broadcasting Service at Owings Mills, Maryland and at the District of Columbia. The PBS stations air the programs and assist with promotion. Each college does its own local promotion and manages its College of the Air program in terms of its instructional organization. The College at which I am such a manager has three campuses; the COA program emanates from the Takoma Park campus.

The quickest way to acquaint you with the program is probably by reference to the brochure or bulletin which we make available to students. It says the following:

> It's easier than ever to earn regular
> college credit without leaving home.
>
> You simply watch your own television set at the designated hours, follow the study guide, read your textbook, and go to the Takoma Park Campus of Montgomery College for two exams. You will have an instructor assigned to you--and you may call that instructor on the phone to get questions answered.
>
> If you don't have access to a television set, you may use the Takoma Park Learning Lab facilities to view the material. If you miss a televised segment or want to see something repeated, the college has arranged to have copies of the programs and will play them for you at a convenient time.

You are expected to attend three on-campus seminars scheduled to assist you further in successfully completing the course and earning college credit.

If you're taking other classes at Montgomery College

You may enroll for any of the televised courses at the same time you enroll for your other classes at any of the three campuses.

Eligibility and Registration

Registration is open to all who are qualified for admission to the College. Register by mail or at any campus.

Taking classes via television is ideal for

- Persons who work at hours when day or evening classes are difficult to schedule
- Everyone who has a desire to learn
- Parents with small children
- Handicapped persons who find it difficult to enroll in other classes

If you need financial aid

You may be eligible for financial assistance to take one of the televised courses.

If you have reached the age of 60

There's no tuition for Maryland residents 60 years or older provided the number enrolled in the class meets state standards. The tuition waiver does not apply to fees or books.

Here's how to buy your books

You may buy your books at the Takoma Park Campus bookstore, Monday through Friday between 8:30 a.m. and 3:00 p.m. The bookstore will also be open Monday through Thursday from 5:00 to 6:30 p.m., or you may buy your books by mail.

Review and Tests

Programs may be viewed in the Learning Lab, Takoma Park Campus, Monday through Thursday, 8:00 a.m. to 9:00 p.m.; Friday, 8:00 a.m. to 4:30 p.m.; Saturday, 8:00 a.m. to 12:00 noon. Tests are taken in the Learning Lab as assigned by the instructor of record.

The course titles and descriptions are then listed. They parallel course descriptions of equivalent courses in the college catalog. There may be any number from ten to thirteen courses. The student audience usually numbers approximately four hundred to four hundred fifty per semester.

Six semesters of questionnaires given to students taking College of the Air courses at Montgomery College, Spring 1984 through Spring 1987, were analyzed for five factors: student demographics, work factors, viewing preferences, student status and choice of advertising preferences. The sample was a minimum of 150 questionnaires randomly selected each semester. Although promotional strategies presently used appear to attract the desired target population, it was thought that additional avenues for attracting enrollments based on these findings might merit exploration. The study summarizes significant aspects of the topic which are pertinent to marketing, and which may be of interest to an audience concerned with visual learning.

Some interesting findings and highlights of the report are that the significant largest groups are consistently in the age groups 26-35; 18-25; 60% to 70% female, with an average age of 29.4 in 1984 that had advanced to 30.4 by Spring 1987. Contrary to the idea that students are eager for knowledge, the predominant reason for taking COA courses was that the students wanted degrees, a commentary on the ultilitarian value structure of the students. Degrees would lead to on-the-job upgrading which means more money. The largest group of constituents had family incomes of $20,000 or more, roughly in conformity to the county census of income brackets--the TV student coming from the mid 40% middle income group--a group which can also afford to pay for viewing. Many of them now say they own VCRs. But the role of the Learning Lab at Takoma Park as a place for viewing the off-air tapes, for which copyright permission is granted to us, continues to be a strong one.

They describe themselves as being largely professional and office workers. There are few older students, senior citizens, who are retired (usually about one percent or less); they do not want or need credit; they do not want to write exams; they want to come to college to interact with other people and have fun taking courses in art, physical education, etc. (On one campus the senior citizens have a club which they have named "The Rascals"!)

Most COA students are daytime workers who select their favorite viewing days as Saturdays and Sundays or at either end of the day, late evening or early morning, a factor important in programming. We have a group of courses offered at another favorite time which is noon. Students can watch in the work place courses grouped under "Lunchtime Learning."

The highest semester for those who are "not currently employed" was spring 1986, up to 13% from 6% in the previous semester. The numbers in this group have remained otherwise steady, around 10%, reaching 11% in 1987. This is interesting because the demand for workers in this geographic area has been and is now very strong, especially in the health, clerical, and service fields, and one sees in shopping malls signs everywhere advertising for help.

Like the community college students on campus, College of the Air students each semester have been predominantly and consistently part-time (ranging from 67 to 70 percent); the full-time student numbers remain constant, and the students are also increasingly attracted to take other courses on the campuses, along with their College of the Air courses--especially at night. Among students enrolled in 1984 to 1987, the range was ninety to ninety-five percent who said they had taken a regular on-campus class at Montgomery College or some other college; seven percent in 1987 having completed work beyond the baccalaureate degree. This would indicate that the latest telecourse populations are not new to college and that we are tapping the edge of a market which we speculate contains former college goers who are refurbishing work skills in business courses or possibly taking their humanities/social sciences degree requirements.

We have long claimed that television courses generate on-site students for the campuses. Our findings concur. In spring 1984, 55% of the students planned to enroll in regular on-campus classes. In fall 1984, 59% had such plans, and in spring 1985, 57% planned to enroll in a regular class on campus. The College of the Air in this sense is a marketing tool for the campus classes.

Spring 1984 students who planned to take another television course numbered 63%; in the fall, 56%; in spring 1985, 62%; the numbers have climbed by 1987 to 85%.

The College of the Air itself appears to generate an ongoing market for its own courses because the students who were returning had been sold by the product they had just experienced.

Most students queried were satisfied that the cost of the text and materials was reasonable.

The students were satisfied enough to say that they would recommend television classes to a friend - 83% in spring 1984, climbing to 92% by 1987. This is probably the most effective medium for getting new students--the recommendation of someone who is a friend and therefore whose judgment you value.

Part of the folklore of instructional television deals with the lure of distant learning and the inability of some students to get to the college campus. In this case, the data shows that the single most important reason for taking a telecourse is to get credits toward a college degree. Second is the need for professional improvement or advancement, and last is general interest. The most important reasons then can be converted into the possible belief that a degree will earn one more status or money, as will professional improvement or advancement, and television courses are a means to the end of increased status or earnings. This is a vital aspect in promotion of the courses. General or cultural interest remains, but not at the same level as the ultimate material gain.

During periods of belt-tightening and fewer options among on-campus courses, telecourses offer an alternative when classes students want are unavailable or are cancelled because of lack of student numbers on a particular campus. Telecourses are transferable to all community colleges in the state College of the Air consortium and to the State university. They are based on one Montgomery College campus but serve an all-college function; thus numbers can be achieved to make the course available through a combination of students from all three of the college's campuses, and the telecourse need not be cancelled as often happens with on-campus courses which do not reach an economically feasible goal. Most courses offered are part of the degree-achieving core, which means that students do not need to put off taking a course because it is not offered on "their" campus. This is also an important factor in extending the times of the offerings through using cable airing at a variety of times.

Another assumption which is part of a general belief is that television courses appeal particularly to students who have difficulty in coming to the campus, or who are handicapped. The questionnaire shows that an increasing number of students had transportation available to them, an increase of 14% in one year. They can get here by car or public bus. Promotion stressing the telecourses as related to transportation problems might well be unrealistic in these terms. Furthermore, only an infinitesimal number of telecourse students--one percent or below--are handicapped.

In a comparison of six semesters, some consistent patterns appeared which provide useful information for consideration in attracting students, and which may be of special interest to new telecourse users.

In all semesters the most cited ways of learning about television courses were

a. through the class schedule;
b. through the COA brochure which all evening students receive from previous semesters in the mail;
c. through brochures which they picked up at the College or elsewhere; brochures are usually distributed to strategic locations like library circulation desks, the registration or counselling areas;
d. through a friend.

The least influence was generated by newspaper advertisements--6% as compared with 42% for class schedules one semester; 1% as compared with 47% for class schedules in another semester, and zero as compared with 47% for class schedules in still another semester.

One of the most disappointing aspects of the reponses to the questionnaire over three years is the very small part played by the College counselors in suggesting College of the Air courses to students. In one semester, ten percent of the students got advice from their friends to take telecourses and two percent got advice from College counselors. In other years the percentages for counselors was somewhat higher--e.g., five percent friends, eight percent counselors, and eleven percent friends, four percent counselors. Brochures are sent personally to counselors each semester. The reasons for their not counseling more students into College of the Air courses will be discussed with them.

Questions about this report can be answered by LaVerne W. Miller, Director, Special Instructional Services, Montgomery College, Takoma Park, Maryland 20912. (301) 587-4090

© LaVerne W. Miller

SECTION IV

VISUAL LITERACY
AND
ART, AESTHETICS & VALUES

The Arts - An Instrument of Vision

Grant Venerable

Liquid space --
    Compressed time --
        Galactic color and cosmic light.

Atomic vibrations
In a crystal performing.
Receiving, conceiving
Bio-Energy
Transforming

Flowing, transcending, vibrating life.

And we are Life!
We are Art
    in molecular form.

My talk today will be on "The arts as an instrument of vision." In addressing that important issue, I will provide you with selected excerpts from my new book, THE PARADOX OF THE SILICON SAVIOR: Charting the Reformation of the High-Tech Super-State, shortly to be released by MVM Productions of San Francisco.

HYDE PART: A PARADOX OF ART AND SCIENCE

It was against the turbulent backdrop of the late sixties, in the culturally rich setting of Hyde Park, Chicago, Illinois, where I would develop my perception of the role of art in a high-tech society. Like playwright Lorraine Hansberry, I too, would discover that the highest gift that man has, is art.

When I came upon that insight, it was not in a sudden awakening to the irresistible power the arts. For at the time, I was actively engaged in postgraduate studies in the Chemistry Department of The University of Chicago. My insight into the import of the arts came on the heels of what seemed to me, a rather unsettling discovery -- unsettling only because it could have jeopardized my standing in graduate school, if it became known among the doctrinaire "science types" on the faculty. For deep within myself, I glimpsed the soul of an artist. Predictably, the personal challenges which I faced as an advanced student of science, brought me face-to-face with a rare opportunity -- the opportunity to experience, first-hand, the mute connection between human struggle and artistic expression.

Paradoxically, it was my time spent in the visual arts -- in oil painting -- which proved so irksome to a large part of the faculty. (I was by that time successfully performing artistic commissions for noted scientists in the United States and abroad, rendering surreal-appearing canvasses on various aspects of molecular structure and physics.) Fortunately for me, those of my mentors who openly applauded my involvement in the arts, were among the most powerful members of the faculty; or I would probably not have survived "politically" to graduate. Yet, it was precisely *because* of my developing artistic sense, that I came to such a deeply felt, *visual* understanding of quantum theory, molecular spectroscopy and structure. I knew then, that it would someday be possible to utilize artistic visualization and drawing to conceptualize complex, scientific and technological problems. And there the matter lay, until I was free of the intellectual restraints of formal education institutions.

The sometimes strange-appearing "truth" which is chronicled in *The Paradox of the Silicon Savior*, began to emerge during a long, dark night of my soul," when I succeeded in freeing myself from the rigidly prescribed mindsets of the conventional world. I emerged to discover that life is paradoxical; that truth is paradoxical; and certainly more contradictory than "sensible." My struggle to survive as a unique, nonconforming individual in a conventional society, became a deeply personal quest for meaning. At some point in life, we seem obliged to ask ourselves: *why* am I here? And how shall I make the most of that circumstance? For me, it opened the door to important inquiries.

CHEMICAL GENESIS AND THE EVOLUTION OF LEARNING:

To be sure, we are living aggregates of atoms and molecules. That makes us *art* in molecular form. Our human nature and behavior are continually created and recreated by complex molecular structures and chemical processes. Apart from all else that we appear to be -- builders, creators, artists, healers or saviors -- we are *chemical organisms*. And that is the crux of the matter -- the paradoxical key to human existence. It is the key to coping with the "god-like" powers accrued to us by virtue of our vast store of scientific and technical knowledge. It is also the key to understanding the fragile veneer of human life.

Through our remarkable chemical nature we are both artist and savior. As "silicon saviors," we have created this age of high technology, and have founded its various miraculous inventions upon the electronic structure of the element, silicon. This is no surprise, for silicon is nearest of kin to the element carbon, the fundamental building block of all living systems. It is man's exploitation of the unique, electronic properties of silicon that has made the difference, between the human condition of the 1980s and that of our grandparents and great-grandparents one-hundred years ago. We experience the difference not only in our technology, but in our cultural and ethical orientations.

THE LEGACY OF THE ANCESTORS;

My grandparents (and their older syblings) were born during that tumultuous chapter of history which spanned the Lincoln, Johnson, and Grant administrations. What a rare privilege it was to have known them, and to have learned their thoughts while they were alive and vital! For their generation seemed guided by an ethic of "being and doing" that has all but vanished in the era of high-technology. For them, life was a precious gift, whose every moment was to be lived as an end in itself. They never presumed -- based on actuarial tables or the representations of politicans or human biologists -- that earthly existence was supposed to last for a guaranteed, minimum span of years; or that life would be free of cares and discomforts. They never, for one moment, believed that anyone -- mortal or divine -- *owed* them life or a living. Life was whatever it happened to be, and it was accepted on its own terms.

And it wasn't that my maternal grandparents, the James Henry Scotts, of Oklahoma, Kansas, and eventually, California, did not grieve, or grieve intensely, over the numbing, personal loss (to illness) of four of their seven adult children. It was, that death was accepted as an unavoidable and natural part of life. And with a faith in some transcendent presence "above and beyond them" -- a faith well-tested in the struggle of their previous, frontier existence -- they finished grief quickly and cleanly; and moved on to face whatever life held next in store.

This unfounded assumption, which has infected modern American society, that the universe owes us carefree existence, in perpetuity, has gotten us into many of the crises which we find ourselves struggling so needlessly against. We paint a picture for our young that leads to false expectations of the way life "should be." As though life were a commodity like an automatic dishwasher, we insinuate "warranties" for happiness, success and health. Money, then, is too often viewed as the key to these virtues.

I mention all of this as background to the important position of the extended family in the development of civilized societies; because the extended family structure can provide us with a model of wholeness. It should surprise no one that whenever this holistic kinship structure breaks down, all human-created systems begin to break down. The nuclear family, as an autonomous economic unit, breaks down; the educational function then breaks down; the management function in corporate industry breaks down; as do computer systems. Government operation breaks down as government agencies begin to frustrate the will of the people they were chartered to serve. And advanced technological systems, which incorporate astronomical investments of money and know-how -- and really should work perfectly -- exhibit inexplicable breakdown.

The systems which we create, work only as well as they are made to emulate whole systems in nature -- such as a living organism. The status of the user interface in computer systems, is worth mentioning in the context of visual literacy.

THE ROLE OF LANGUAGE IN THE SILICON SUPER-CULTURE

High-technology industry -- including aerospace and defense, strategic materials, consumer electronics, computer hardware and software, and communications -- seems indulgently oblivious to its own Achilles' heel, namely, unwieldy and inefficient language. It is a symptom of the industry's remarkable addiction to logical-digital thinking. That is, consider-each-part-in-isolation-from-the-whole thinking. Which, in turn, creates even more unwieldy language.

The primitive state of the user interface in computers is but the tip of the iceberg of a larger problem. Without a clear, easy-to-use interface, it would be impossibly difficult for a human (user) to tap into the power of a computer system or its software applications. The user interface is the vital link between the computer system and the individual using it; and between data and the programming that will process it according to the individual's wishes. A competent interface must efficiently communicate to the user a sense, or visual impression, of how the system is structured; and how to gain access to that structure. In principle, that may be achieved in either of two ways: 1) The manufacturer provides the usual, dictionary-sized catalog of endless instructions, detailing every single operation the computer and its programming are capable of performing (left-brain approach). Or, 2) the manufacturer can provide a visually literate picture -- a conceptual framework -- of the system's operations, along with a simple key to performing any task the user desires. Then the user is free to determine what pathways work best for completing the task at hand (balanced brain approach).

In general, computer documentation -- especially the user manual -- is visually uninviting and nearly indecipherable. It is also much too encyclopedic to absorb in a lifetime, except for the persistent few who are technically oriented. The fact that such documentation is produced in conventional linear language -- words, sentences and paragraphs -- biases the brain's circuitry in favor of the slow, plodding, detail-oriented *left hemisphere*. The visually-stimulated, rapid-scanning capability of the *right brain* is neurologically short-circuited.

Indeed, most of the available high-tech documentation, whether in printed form or computer screen displays, works at counter-purposes to the neurological structure of the human brain. Were we to consciously design a user interface whose objective is to *conceal* from the user the very information required to operate the system, we would be obliged to invent most of the documentation already in vogue.

This would not be so, were industry at least aware of the limitations of linear language. For when language is limited, thinking is limited. When language is only linear and sequential, then thinking is exclusively linear and sequential. When language is fragmented, thinking is fragmented. When language is *visual* and *whole*, thinking is *visual* and *whole*.

The user interfaces commonly available on most of our technological systems are the product of linear language and linear thinking. They are, therefore, limited in their capability to communicate to those using the technology. But language (that is, the "form" of its representation and usage), must be enriched and unified. More and more this will come to be recognized as the province of the arts -- to *conceptualize* complex systems -- and thereby, to assure the vitality of the High-Tech Super-State. For the visual arts afford a direct, neural pathway to the creative, intuitive potential that lies other wise dormant in the right cerebral hemisphere.

CULTURAL UNHINGEMENT:

The late physicist Albert Einstein once said that chemistry was much too important to be left to chemists. As a chemist by training, I would venture the observation that *the arts* are much too important to be left to artists. Our survival as a species of creative, self-aware primates is too dependent upon the fate of the arts to be left to artists and art educators. The arts have a uniquely important role to play in the reformation of the High-Tech Super-State, for we are in the midst of the most turbulent period in human history. It is at once thrilling and terrifying. We have come "culturally unhinged," and the unenlightened, unthinking use of the computer is as much to blame as anything else.

For by the grace of the microprocessor, we live by computer technology, and the digital, rule-governed thinking patterns which it imprints upon the gullible left cerebral hemisphere of human brains. Therein lies our culture shock -- the impact of new technologies on old, rigid habits of thinking and teaching.

There is no question that high technology has accelerated the rhythms of our culture. Our internal biological clocks were dissynchronized; and we did not guage the possible consequences that we ought to be prepared for.

So we embraced the internal combustion engine; fast-food franchising; artificially refined foods; electronic labor-saving devices; transportation at the speed of sound; high-density, high-rise urban centers; high-volume freeways; star wars weapons development; dioxin; nuclear power plants; chemical fertilizers; hormone-injected meat; Excedrin; plastic money; low-tar cigarettes; and the computer itself.

These staples of our era (and many more) have contributed to our disorientation. We have come unhinged because we could not cope -- because we did not foresee that someday we would be forced to cope with our own creations, actions and poor judgments. We are the modern-day guests at Belshazzar's feast. The handwriting is on the wall.

At the heart of what I have to share with you is this question: What makes us human, and how can we make the most of our humanness? Which brings us face-to-face with one of the most frustrating paradoxes that we face in the High-Tech Super-State.

ARTS AND DRUGS:

The issue of drug abuse is a social battlefield, strewn with conflicting views and logical inconsistencies. On the one hand, we have legal drugs, and on the other, illegal ones. The inconsistencies come about from society's habit of speaking from both sides of its mouth; when we ignore the harmful potential of many legal drugs -- caffeine (in coffee), tobacco, alcohol, and valium -- yet deny possible social benefits (in medicine and psychiatry) of some presently illicit drugs. I speak here, from the perspective of the chemist -- not as a moralist -- and with deep concern for our time-worn inclinations to create cultural environments that openly invite drug abuse and social degeneration.

We are faced with a challenge to make a clear choice with respect to public education policy. Either we continue in our "fiscally conservative" hallucinations of grandeur, to "control costs" by cutting low-priority budget items (a polite euphemism for the arts). Or, we face up to our responsibility as civilized beings. And we reconcile ourselves to paying the obligation, not only for math and science, but for the "neurochemical benefits" of the arts in the optimum brain development of our children. It is the only way, ultimately, to avoid the astronomical financial burden which accrues in time, from rampant disease, drug abuse, crime, damaged relationships, and technical systems failures. The sins of the fathers (and mothers) have been visited upon the children. We are paying now -- dearly -- for the sins of omission of hardly less than a generation ago. And in our continuing ignorance of our own nature as chemical organisms, we are unwittingly incubating the untold havoc with which many future generations will have to contend.

But what is our nature? Curiously, our nature is "addictive." As a complex, mental animal, we are drug addicts by nature. And we must not fear that fact, but understand it. Were we not subject to drug addiction, we would not be human, with all that is implied by our humanness. It happens that those substances which we term "drugs," whether harmful or beneficial, are drugs because their behavior inside the human body strongly resembles, or mimics, the structure and activity of the body's own naturally occurring, neurochemical substances. The fact that we are addictable to any drugs -- over-the-counter prescriptions or self-destructive street drugs -- only confirms that the nervous system contains neuroreceptor sites for drugs to bind to. We may conclude from this striking state of affairs, that each of us is born, at least potentially addicted to all manner of drug substances, whether legal or illicit.

It is through regular "maintenance doses" of artistic activity -- the visual representation of information, painting and drawing, for example -- which helps our resilient brain to maintain its proper neurochemical balance. It should likewise come as no surprise that individuals with subnormal levels of vital brain chemicals would be drawn toward available substitutes, like marihuana, cocaine, or even heroin. Just saying "no," while providing an admirable start, is, of course, but a tentative first-step toward resolving the deeper, unrecognized sociological roots of drug abuse in our modern techno-cultural society.

THE ROLE OF THE ARTS

But let us consider the healing power of the arts, which are still the only authentic measure of our humanness; no matter how sophisticated our technology becomes. The arts evolved alongside of -- as a natural attribute of -- our humanness over the last one-hundred-thousand years. I suspect that we have only fooled ourselves, in behaving as though science, math and language are more basic than they really are. Certainly those vital disciplines do seem to imply a more direct connection to concrete, "practical" commodities -- from MX missiles to designer jeans. But in respect to its connective, intuitive content, and what makes brains balanced, whole, and capable of tacitly organizing complex concepts, the fine arts are vital and indispensable. The fine arts provide a natural remediating context -- neurochemically and spiritually -- for the human mind and body.

Through society's failure to mandate sufficient art experience in school and college curricula, we unwittingly rob our young of -- not only the development of visual literacy -- but also the primary means for maintaining neuro-psychological health.

The tools of the artist are powerful instruments of cognition, and recognition. Ultimately, then, they are instruments of vision. The visual artist, like nature itself, creates unity through disparity, and harmony through difference. In the absence of the artist's sense of a unity of diverse parts, we cannot create technological inventions that function properly. It is the artist within the engineer, that strives for wholeness, that seeks for perfection.

The artist alone, among all other expressers of human intention, invents and utilizes fine sensing tools that make possible the conceptualization of any system -- no matter how complex. It is the artist within the computer engineer that knows how to design harmonious user interfaces which reflect a unity and flow shared in common by all high-quality designs. Advanced engineering systems possess more dimensions of complexity than the logical-digital mind could ever handle. Not so, the artistic state of mind, which can bring to bear the intuitive, guiding sense that equips the engineer to represent what is other wise unrepresentable on the drafting board.

The critical need of our era is not simply to see and to see whole. And the role of the arts in civilized societies is the same as it has been for the last ten-thousand years: namely, to ensure the continuity of our humanness. It all comes down to the realization that the creations we fashion, eventually reshape our own nature in turn. If our creations lack human qualities, so will our humanness be made less. Our sacred purpose as practitioners of art, is to tune the senses of the young, so that they may behold the beauty and greatness in their own beings... and ultimately to express it in their lives, careers, and relationships.

And lest we forget, we are life, because we are art in molecular form. And the power of art springs from the spiritual vitality that resides in the human potential. To teach that power is impossible, but mysteriously enough, that is the role of art -- to enliven, to heal, to make whole.

© Grant Venerable, 1987

An Artist's View of Visual Literacy for the Non-Artist

Debroah Curtiss

Introduction

Above all, I want to say what a pleasure it is to have discovered the I.V.L.A.! In 1984, when I was writing the final draft for my book, **Introduction to Visual Literacy: A Guide to the Visual Arts and Communication** (Prentice-Hall, 1987), a computer search on the topic of visual literacy, yielded very little--a reference to some meetings back in the 1960s, but nothing more recent. At the College Art Association 1987 annual meetings, I met Kathleen Bick from UCLA who put me in touch with Bob Muffoletto, and so began what I hope will be a propitious interaction.

It appears to me that members of I.V.L.A. come from a broad range of backgrounds and interests, but one area that seems little represented is that of my own bailiwick, the fine arts. By way of introduction, I am, first and foremost, a practicing artist, passionately in love with the entire world of visible and visual experience; one who paints in order to express so much that cannot be adequately expressed with words; to come to know what I other wise could not articulate.

At present I am not teaching, but have taught basic design and color; drawing at all levels, including figure; and advanced painting, for fourteen years at the Philadelphia Museum of Art and Philadelphia College of Art (recently renamed University of the Arts); and developed a course, Visual Awareness, for the Center for Contemporary Studies at Temple University, which I taught for five years, and for which I wrote my book.

In my experience, translation from image to word is most often inappropriate, a process that is subject to personal bias, cultural trends, and doctrinaire prescriptions. Therefore, in **Introduction to Visual Literacy**, while I use the model of verbal literacy and communication, I focus on the basics of visual expression: the vocabulary, concepts, and procedures that are shared among all visual arts, design, and visual communication. I endeavored to present an overview of the total picture, the whole gestalt of visual arts and communication, in as clear and direct a manner as I could devise. Obviously I felt there was a need for such a book, such an approach to visual education.

Background

When I was an art student, the gap between visual concepts and activities, and the words we used in trying to articulate, describe, and justify these activities, felt like a cross between a chasm and a morass. Words were used out of context in flowery or fuzzy ways. Frustrated and dissatisfied by my own inarticulateness, I shut my mouth and opened my eyes and ears, so to let in a wealth of visual experience and learning.

When I began to teach, several years after graduating from art school, however, I couldn't avoid the confused looks on my students' faces, that indicated that I hadn't come very far. As there is no learning like teaching, I designed a course called Visual Awareness, and therewith began to identify a verbal vocabulary about visual experience, one that would be accessible and meaningful to the general educated public as well as to art and media professionals.

To a significant degree, I was motivated to create this course by the enormous growth in visual communications. Thanks to this growth, our current ability to spew forth a multitude of visual statements in a matter of moments, presents a profound challenge: we might be buried by a deluge of visual rubbish (some say we already are), unless we attain discerning visual sensitivity and acumen among the population at large. It is my opinion that our best approach is to contribute to a civilization where visual literacy and verbal literacy are valued as equals.

In developing the course, I initially lacked an overall context, a structure, a model for the whole gestalt of visual expression; which, if such a thing were found to exist, might provide a procedure for more effectively linking word and image, and it would also embrace the many facets of the visual arts. In 1977 when I first consciously encountered the concept of visual literacy, I was wary: it could be too theoretical and too prescriptive--qualities that are, in my opinion, contradictory to the very nature of the visual arts. But the visual arts do communicate--some more intentionally than others--and while there are significant differences, verbal language and visual expression share some noteworthy common attributes: both use marks and symbols to convey information, and both have organizational principles and stylistic alternatives. The greatest difference between visual and verbal communication is manifest by the immediacy of pictures and the greater precision of words. When used together, the complementarity of word and image is a powerful communication tool, as the development of visual communication media over the past forty years attests.

A Broad Definition of Visual Literacy

In defining visual literacy, I have borrowed from the definition of verbal literacy--the ability to speak, read, and write a language--and consider visual literacy as the ability to understand and evaluate a visual statement in any medium, and the ability to express one's self with at least one visual discipline. Implicit in this broad definition are many of the attributes of visual literacy that have been articulated and developed by such thinkers on the topic as John Debes, Donis Dondis, and Richard Sinatra. My goal, from the perspective of a visual artist, was to create a foundation of visual literacy with which persons from a variety of backgrounds could more intelligently appreciate the visual arts, visual communications, and the entire visible world in which we live. While I personally enjoy intellectual and theoretical discourse, my goal is best served, I think, with directness and clarity.

A Visually Literate Person

A visually literate person understands that any visual statement is open to interpretation as to its content, its subject matter and meaning. While media producers and designers may use word and image conjunctively, so to be as specific as possible about the intended content, communication and effect, they cannot totally control the personal agendas and interpretations that their audiences will bring to the completion of the communication cycle. With the crafts, fine arts, much of design, and multimedia visual expressions, the point is not to try to understand specifically what the maker was trying to communicate--because that is often obscure and fuzzy even to the creator--but to receive whatever comes across by looking and fully experiencing visual statements and objects.

With respect to form, a visually literate person has knowledge and fluent use of the elements, the alphabet as it were, of visual expression; the compositional principles, or grammar; is aware of stylistic options; and has the ability to express him/herself with at least one visual medium. We would not consider a person fully literate who could read but not write, so a person who only passively appreciates art and visual communications is not fully literate either. Only through the active creation of visual statements can we ever fully know and appreciate the visual statements of others. There is something profound that happens when the eye, mind, and hand work together and both perceptually and kinesthetically effect the shape and form of a thing, as all studio art teachers know. The ability to draw, to take a decent photograph, and to arrange objects effectively in space, are basic, fundamental skills, and no person without them should consider him or herself fully educated.

As with verbal literacy, visual literacy is an ever-evolving and lifelong search for learning and new experience. As such it is an ultimate goal of all visual experience and expression for creators and viewers alike. Because of its pervasive importance in our lives, it is my considered opinion, shared by most I.V.L.A. members I suspect, that visual literacy should be taught as the basic and fundamental language and outstanding learning tool that it is.

Neurophysiology, development psychology, and educational research have contributed to the acknowledgement that the stimulation of sensory input and awareness, along with challenge of the intellect, results in an increase in both the capacity and the ability to learn more effectively. By placing an appropriate emphasis on visual literacy in teaching, we restore the sense of vision as a primary learning tool, and support its integration with the intellect in a complementary and powerful educational synthesis.

As I have come to know and appreciate the power of visual thinking, visual problem-solving, and visual expression, my questing mind and spirit have been abundantly rewarded. I have come to recognize moreover, compared with my studies of philosophy, music, mathematics, and logic, that visual expression entails the highest and most complex procedures of cognitive and intellectual activity. It is time we realize that the students who don't fare well in academic studies, are not necessarily inferior minds, they just may think differently. Spatially some say, and that is probably true. I say also, sensorially.

The Importance of Visual Literacy for other Professions

It is interesting to note that all the professions that are commonly held to be on a high plane of intellectual endeavor and expertise--such as medicine, science, law, government, education, engineering, management, or human services--require and entail keen visual perception and thinking. Most people in these professions learn their relevant visual skills by hit-or-miss absorption. By bringing visual literacy to the fore, as the effective and important learning tool that it is, we, as visual artists, educators, and media producers, have the opportunity to make visual experience and expression both more viable and appreciated by persons from all walks of life.

A Syllabus for an Introduction to Visual Literacy

The course syllabus that I present herewith offers an opportunity for the restoration of the sense of vision as a primary learning tool, and for its integration with the intellect. It is for a four-credit, one semester course, offered as an elective at a university, but, I think it is adaptable to a variety of formats. The students who took the course were about 25% art and art history majors, 25% radio/television/film majors, 20% education majors, and the remaining 30% were from all walks of life, such as criminal justice, pre-med, social work, political science, pre-law, literature, and business. The classes were about half and half undergraduate and continuing education. It is a course that is flexible and adaptable to a variety of teaching contexts, and to a broad audience.

In response to the diversity of students, I included in every class and for every homework assignment, three different educational approaches. They were:

Descriptive: visual experience sharing, both oral and written;

Analytical/Evaluative: lecture, discussion, and analysis of a variety of visual statements and topics; and

Synthetical/Experiential: hands-on visual problem-solving in a variety of media.

By using this multilevel approach I was able to engage these diverse students with their most efficient learning mode, and then bring the other modes into balance for more thorough reinforcement and effectiveness. The goal, both mine and theirs, was to launch them on a lifelong quest for visual literacy, which included competent visual expression, and keen visual appreciation and intelligence. I found that by integrating the intellectual concepts of visual literacy, composition for example, with the act of making visual statements, students were able to target the concepts more specifically and achieve them more readily.

Let us now turn to the syllabus to which I have added [in brackets] explanatory comments. I wish to highlight several terms, concepts, and procedures that may be new in the realm of art fundamentals, beginning with the first class (1. at the bottom of the page).

Transformative Vision

Transformative vision pertains to representational drawing, and is a concept that I introduce in the first class when, after doing "blind" contour drawings of roses (when students don't look at their drawings) I allow them to draw reflexively, i.e., looking at both the rose and their drawings. Transformative vision is the ability to see the world as a complex "jigsaw puzzle" of abstract shapes and tonal variations--the very shapes and tonalities that we put down on paper and which, wonder of magical wonders, create the illusion of the objects and spaces we are seeing. When students learn that this is what they are doing, and transformative vision is what it is called, they are more likely to give up their attachment to what they know--that the leaves of the rose are longer than they are wide, for example, and begin to see with clear, unfettered vision the multitude of abstract shapes: the fundamental requisite for learning to draw. Diminution, convergence, and foreshortening become easier to teach when students have a name for how they are seeing, what they are trying to achieve, and understand why it is important.

Introduction to Visual Literacy

A College Course

This course has been developed for entry level art students and for intelligent persons of broad interests who wish to become visually literate and articulate.

It develops the basic skills of seeing, eye-mind-hand coordination, and visual thinking for problem-solving. It provides the basic verbal and visual vocabularies utilized by all the visual arts. At the same time, the formal aspects of visual arts and communication are explored through experiential studio investigations. Thus all modes of thinking and feeling are integrated for an optimal learning experience.

The course is here presented in fourteen weekly segments as given at Temple University. The format is for a four-credit course, four hours per week in the classroom/studio (one room equipped with tables or drafting desks, slide projector and screen). However, the material is adaptable to a wide range of class and term lengths.

Supplies provided by instructor/school: roses (one per student), 14 x 17" paper, 1/2" black masking tape, oil pastels (reused with a few new boxes added each term), one 6 x 9" pack of 204 Coloraid papers, rubber cement, several matte knives, 9 x 12" tracing paper, two heads of leaf lettuce. Fee charged if necessary.

Twenty to twenty-five students is the ideal class size because becoming visually literate requires ample opportunity to express one's self both verbally and visually. Slides, films, open discussions, roundtable visual experience sharing, small groups, and dyads, are interspersed throughout the classes.

Visual arts teachers are encouraged to adapt this course to their own foundation programs.

Text: Deborah Curtiss, **Introduction to Visual Literacy: A Guide to the Visual Arts and Communication,** Englewood Cliffs, NJ, Prentice-Hall, 1987. (**IVL**)

Supplies: an unlined note/sketchbook, 8 1/2 x 11 to 14x17, with removable pages. Drawing pencils. Access to a camera, 2 rolls of (non-slide) film.

Ongoing assignment: a log/journal/sketchbook of all classes, assignments and relevant experiences. Allow for 6 to 8 hours out of class study and work time per week.

1. Introductions [students introduce themselves, their major and/or occupation, how they spend their time, why they signed up for the class].

   Lecture/Discussion: What is Visual Awareness/Literacy? Goals and requirements for class. Ways of seeing. Eye physiology.

   Studio: Exercises for improving focusing [each student given a rose for study], peripheral, and scanning vision [pp.8-11 **IVL**].

   Assignment: Read Section I, pp. 1-11 **IVL**. Do Ch. 1 exercises 1-5 p. 243. Do each of the Ch. 2 seeing exercises in sketchbook/log daily; note time spent on each. [Several hours each week spent in reviewing and commenting on assignments. Credit or no-credit given. Students may resubmit for credit at any time during the term.]

2. Visual experience sharing (VES). [Students are asked to tell about a particularly strong visual experience or insight they had during the past week. Each person may be limited to two or three minutes. This procedure is followed each class until every student has become articulate in extemporaneously verbalizing visual experience.]

   Studio: Place three strips of 1/2" black masking tape, parallel to sides of 14x17" paper: two in one direction, one in the other, and extending fully from edge to edge. When finished, turn paper over and write down the sequence of thoughts, decisions, and reasons for the choices made. Put up work to show it to advantage.

   L/D: Visual preferences, biases. Esthetics. Visual thinking, apreeneness.

   Studio: Use tape and paper and make free design (no rules). Rate apreeneness on scale 0 to 10.

   Assignment: Continue seeing exercises in weakest area. Read Section VI introduction and Ch. 16, pp.

215-221 middle of first column. Do Ch. 16 exercise 2--includes a visit to an art gallery [list given in class], and make a sketch of the work you selected. Then do exercise 3, p. 246.

3. VES: Gallery visits
   L/D: Heritage and its influence on our seeing. [Students are divided into identity groups according to gender, religion, ethnicity, education, economic and environment background, regrouping for each category. In each group they focus upon and share how each aspect has affected their visual awareness. One person from each group summarizes these experiences and effects for the whole class.]
   Studio: With oil pastels on 14x17" paper, depict the visual memories brought forth. [Direct sensory expression is encouraged, description and narration are discouraged.]
   Assignment: Read Ch. 17 pp, 228-237. Visit a place or person of your heritage and make a visual statement, in any medium, that captures your experience of that place or person. Rate apreeneness 0-10.
4. VES: Heritage visits
   L/D: Basic elements of visual statements: dimensional elements.
   Studio: Perspective (importance of one's point of seeing) practice and theory, transformative vision. Drawing of boxes.
   Assignment: Draw a corner of your room showing two walls and either ceiling or floor. Read Section II, Ch.3 pp. 13-34. Do Ch.3 exercises 1-8 pp. 243-244, with one picture for each. Prepare for quiz on terms and concepts of the chapter. Bring pen to next class.
5. VES: Perspective drawing critique
   Quiz on dimensional elements [15 minutes to define five terms selected from eight given].
   L/D: Function and use of texture, pattern, direction, movement.
   Studio: Pen and ink explorations of above elements.
   Assignment: Work up one of the studio ideas into a meaningful visual statement. Read Ch.4 pp. 35-39. Make a list of all previously unknown terms from Ch.4, find an example of each in the world about you, and document it either verbally or visually. Bring 3 magazine pictures to class 6.
6. VES: Pen and ink drawings; color discoveries. Clarification of color terms.
   Studio: discover color changes [make one color look like two, two look the same, two colors look like the opposite ground; using Coloraid papers].
   L/D: Composition and design, basic underlying structure. Evaluation procedure.
   Studio: Using tracing paper over brought-in pictures, do figure-ground, lines of force, and centers of interest analyses. Evaluate each picture according to its structure.
   Discussion: Did the evaluation concur or conflict with your initial response to the pictures? [i.e., did exposure of underlying structure reveal previously unseen strengths and weaknesses?]
   Assignment: Do four of Ch.4 exercises from 1-8 p. 244, with one picture for each. Prepare for quiz on color terms. Read Section II, Ch. 5 and 7 pp.41-52 and 61-67. Make three color designs with coloraid paper [students select six sheets from class pack], demonstrating formal, informal, and radical balance, and at least two kinds of color change.
7. VES: Critique color designs
   Color quiz
   L/D: 3-dimensional spaces and their organization
   Studio: rearrangements of objects in classroom/studio to express specific qualities. [This is a fun class where available furniture is utilized to express environments that are: austere, chaotic, businesslike, intimate, humorous, aggressive, etc. It is a time for students to free themselves further from narrative dependencies and get more connected with direct communication of objects and spaces.]
   Assignment: Evaluate and rearrange your room, drawing before and after floor plan sketches. Write a justification for end result. Read Ch. 6 pp.53-60. Bring ten pictures to class 8 for compositional analyses. Bring log/sketchbooks for mid-term evaluation and response.
8. Turn in log/sketchbooks.
   Studio: Compositional analyses from Ch. 6 with provided pictures.

L/D: Thought processes which promote or impede effective visual statement making. Issues of spatial planning and environmental design followed by a 45 minute walking tour of five nearby public spaces/environments.

Assignment: Evaluate (three step: good, bad, do to improve) two of the five places visited: the one you liked most and the one you liked least. Choose a public space not on the tour, evaluate it, and draw a sketch that indicates its quality. Read Ch. 16 pp.221-227 and Ch. 13 pp. 167-176. From p. 221 write down each of the blocks to creativity that is relevant to you, how it has affected you in the past, and steps toward overcoming it in the present. Bring camera loaded with film (no slides) to next class (borrowed and Instamatics accepted).

9. Discussion: Thought processes and blocks to creativity.

L/D: Compositional analysis of time-oriented visual statements.

Studio: within the limits of one hour and one city block, take 20 to 24 well composed photographs. Return to discuss experiences.

Assignment: Evaluate a time-oriented visual statement (video, film, or performance) on its visual/formal aspects. Provide both verbal and visual examples and assessments. Bring 4x5 prints of photos taken in class; select the first, second, and third best, and the worst: mark on back 1,2,3, and X. Read Section V introduction and all introductory paragraphs and summaries of Chapters 10 through 15 pp. 95-213.

10. Discussion: issues of analyzing composition of time-oriented visual statements. Critique photos.

Studio: Second photo session to utilize learning from critique. Emphasis on exciting, excellent composition.

L/D: Formats and media options for visual expression. Making choices for final project and major.

Assignment: Read at least two chapters of 11-15 in their entirety. Begin thinking and planning for a visual statement, in the medium of your choice, for the final project. Read Section IV, Ch. 9 and 10 pp.69-93. Bring two best photos to present in class.

11. Critique new photographs.

L/D: Style in visual arts and communication; visual examples.

Small group discussions, divided according to chapter 10-15 media classifications, to brainstorm final project.

Assignment: Do exercise 1 for Ch. 8 and 9, p. 245. Read Ch. 10 pp.98-117. Prepare statement of intent for final project; include preliminary sketches. Bring 3 to 4 vegetables or fruits to next class.

12. Discussion: Final project proposals.

Studio: Drawing: integration of all aspects of visual literacy. [Individual fruit and vegetable studies followed by a complex "vege-scape" (all fruits and vegetables arranged on a bed of lettuce). Shoes are also a good subject.]

Assignment: Work on final project. Read Ch. 18 pp.238-241; do Ch. 18 exercises 1-4 p. 246. Finish drawings and bring to next class. Bring log/sketchbook for final evaluation.

13. Critique drawings. Turn in log/sketchbook.

Studio: Collage and assemblage: modes of visual expression (along with drawing, photography, and spatial planning) readily accessible to the non-artist. Critique.

Assignment: Complete final visual project.

Out of class Final: Ch. 16 exercise 7 p. 246 [a seven-step thorough analysis of an original work of art].

14. Exhibit and critique final projects.

Celebrate visual awareness and literacy [either at my studio or I bring in slides of my work. Party time]!

Apreeneness

The second term is probably unfamiliar, one that I discovered in the writings of the perceptual psychologist, Manfred Clynes*, and is introduced in Class 2. Being apreene, having apreeneness, refers to the clarity of perception to which I just referred. It is being unfettered with extraneous thoughts or concerns.

Think of a time when you saw something that totally astounded you.

The image that just flashed into your mind is readily available because the intensity of that experience was so great that all other awareness was thrust aside, and an indelible visual memory was left.

What if we could create that quality of perception at will, and extend it in time? Isn't that, in fact, what we try to do, or hope will happen spontaneously, when we enter our studios to work? One of the reasons that that state of being remains so elusive is that we haven't had a name for it. Given the label, the term, we can set our minds to achieve it, to enter into it. After the fact, we can also evaluate our apreeneness when doing a task, visual or otherwise. By giving students the concept, and a scale from zero to ten, it is amazing how readily and accurately they can evaluate their own apreeneness when solving a given visual problem.

Visual Thinking

Being apreene is related to visual thinking, another topic introduced in Class 2. Instead of merely labeling and defining this act of visual communication, I would like to illustrate it, using the studio exercise we do in this class. Visual thinking is what we do when we receive, alter, and create visual statements apreenely; when we use our assimilated visual acumen and intelligence to respond to visual phenomena in ways that are free from extraneous theory and preconceived notions.

Before defining this term to my students, I give them a very simple visual problem: with a 14 by 17 inch piece of paper and three pieces of 1/2 by 18 inch black tape, they are to place the three pieces of tape across the paper from one edge to the other, parallel to the edges, one tape strip in one direction, and two in the other. When they are finished I ask them to write on the back how they chose to place the tape strips. They are then asked to put their solutions up on the wall for discussion.

First I will show three non-visual-thinking solutions to the problem, and read their descriptions:

1) "Well, gee, I wanted to be different, but the rules were so restricted. So I figured probably nobody else would put their tape right at the edges, or right next to each other, so that's what I did. That's also why I hung it up there on a diagonal, to be different. That's what art and creativity are all about isn't it? Being original?"

2) "Well, when I see black lines on a white page, it reminds me of windows, so I put the tape on to look like window panes. All the small window panes I know of are vertical so that's why I put my paper up that way."

3) "I remembered in an art history class I had, about the golden rectangle. I couldn't remember quite how to make it, and don't think I have the tools anyway, so I just tried to get as many of the six rectangles to come as close to this "ideal" proportion as I could remember it. I always think of it as horizontal, on Greek temples and things, so I put it up horizontally. It reminds me of Mondrian."

None of those students was thinking in purely visual terms. Being different, narrative descriptions, and extraneous associations and concepts dominated their solving of this visual problem.

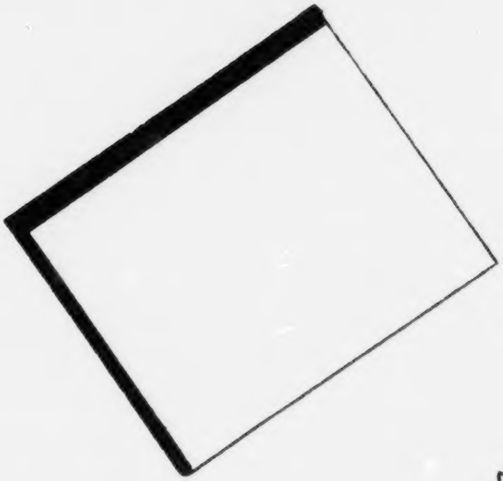
The description of a visual thinker, by contrast, sounds like this:

4) "I took the first tape, and holding it above, ran it up and down the paper, first vertically and then horizontally. When I found a place where the division of space was interesting to me--it was sort of hunchy, emotional I guess--I put the tape down. I then did the same with the second tape, trying it out both parallel and crosswise. I liked it parallel best, so put that down. Then I had only the crosswise tape to place, and like I said, put it where I felt it looked best. I then tried putting it up both horizontally and vertically, in all four directions, and liked the way it looked vertically with the double stripes on the left and the horizontal stripe toward the bottom."

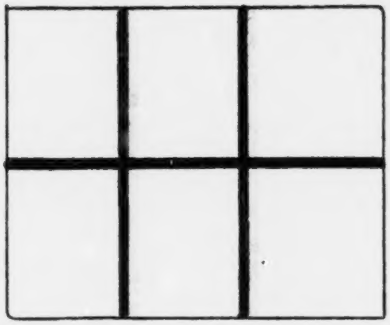
---

* Clynes, Manfred, *Sentics: The Touch of the Emotions* (NY Anchor/Doubleday, 1978), pp.205-6.

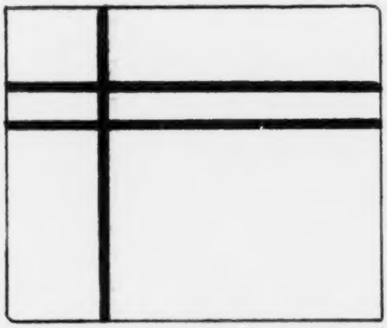
1



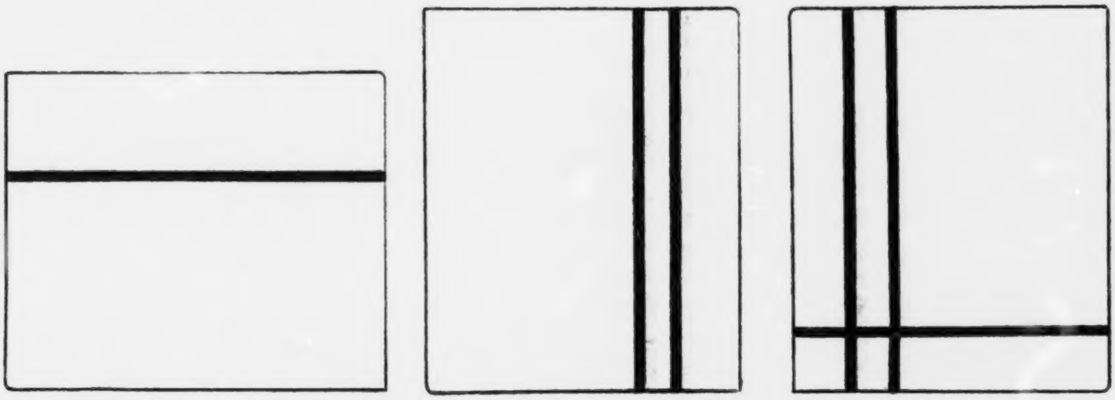
2



3



4



I thought it interesting that this last student recognized the intuitive, hunchy aspect of her thinking, and also felt that her decisions were emotional. After our class discussion, she and her classmates came to appreciate that visual thinking and visual problem-solving integrate intuition and feeling with highly rational and cognitive acts. Visual thinking entails complex decision-making, decisions that are empirically based upon prior learning and experience, and experiments that entail both inductive and deductive reasoning. The scientific method is no stranger to visual artists either--we postulate, consider alternatives, and test--as thoroughly assimilated and natural parts of our creative process. Just because our thinking is mostly non-verbal, and our results are more qualitative than quantitative, it is no less cognitive and rational.

Our "dessert" in this class is to use the tape freely for personal expression, and, if one wishes, to take the work home to enhance with other black and white media.

Heritage

In Class 3 I encourage students to get in touch with their personal backgrounds, and how all their prior experience has influenced how and what they see. The affinity groups according to gender, religion, ethnicity, and so forth, enable students to contact their own vast reservoirs of visual experience, so to draw upon this rich resource for subsequent visual expression. We also discuss bias and personal preference, and the difference between subjective and objective thinking and response.

The Elements

Then it is time to get down to the basics of visual literacy: the alphabet, grammar, and stylistic possibilities of visual expression. It may seem bold to introduce perspective--the study of which takes a semester or more to master--in one shot in Class 4. But it is an effective format for introducing the dimensional elements: point, line, shape, mass/form, and time. I neither expect or demand immediate success in perspectival rendering, but their efforts, no matter how clumsy, increase perceptual and dimensional awareness.

The exercises from Chapter 3 require the use of pictures cut from magazines. Each element is located, highlighted, and its use in the visual statement described. Classes 5 and 6 continue the exploration of the elements of visual expression with an emphasis on the more complex dimensional elements of texture, pattern, direction, and movement; and color and value, respectively. As with all the classes, hands-on visual experience and expression are integrated with theoretical learning.

The Compositional Principles

The compositional principles: unity, scale, orientation, proportion, balance, dominance/subordination, focal points, repetition, rhythm, contrast, variety, energy (lines of force), tension/conflict, and resolution (unity), are the grammar of all media of visual expression. They are introduced in Class 6, and remain a significant focus of all classes that follow. Developing the "X-ray" vision that enables us to see the underlying structure of visual statements is the most significant and empowering act in becoming visually literate. Using a variety of visual statements--magazine pictures (for hands-on tracing paper overlay diagrams), slides of art objects and three-dimensional objects and spaces that are analyzed by demonstration in class, and also time-oriented videos and films--we analyze and analyze until we assimilate compositional seeing as an integral part of our being in the world.

We also discuss evaluation. As a kid I was a member of 4-H, the motto of which is, "To make the best better," and that is the tone and purpose of critically evaluating what we see and do. The three-part process,

1) What is good about the object or image; what works well and why;

2) What is not good; is unintentionally unresolved, ambiguous, or awkward; and

3) Recommendations for improvement,

permits a broad range of responses and ideas.

In classes 7 and 8 we move from the two-dimensional world of pictures into the three-dimensional world of the classroom as a whole, and then out into the city to become aware of architecture and the use of public space.

Using the camera to transform the three-dimensional world to a two-dimensional format, students endeavor to make excellent visual compositions. Because of my own personal experience, that I learned more about visual composition looking through a view finder than I ever did in a basic design class, I have high regard for the expedience and effectiveness of photography as an educational tool. Experienced photographers may do their own enlarging, but I insist that, however the film is developed, the entire negative be shown. If a student wishes to refine the composition with cropping, he or she is welcome to do that in an additional print or a hinged mat.

From Viewing to Making Visual Statements

The emphasis in the course gradually shifts from the perception and evaluation of the visible world, through the making of carefully framed and assigned visual statements, to the realm of individual creative visual expression. It is not great art that we are aspiring toward, but aware, thoughtful, and effective visual statements.

Style

Along the way we learn about the stylistic options of representation, abstraction, non-representation, and the stylistic schools of the past: classicism, romanticism, impressionism, expressionism, modernism, and their stylistic offspring. Our goal is to become conversant with historical context and stylistic possibilities, while we come to recognize our affinity and preference for particular styles. We also learn to evaluate and aspire toward excellence in craftsmanship and technical execution.

Final Requirements

The final requirements of the class are in two parts. One is a thorough analysis of an original work of art, design, or visual communication. The other part is a final project: the creation of a significant visual statement in the medium of the student's choice.

The thorough analysis--each step of which has been practiced in previous homework assignments--of a work that has been selected by the student (and has included hand-crafted vessels and ornaments, African sculpture, buildings, films, videos, and performance art) includes written, visual, and diagrammatic statements about

1) the identity of the work: its title, formal dimensions, media and techniques utilized;
2) the student's interpretation of the content; that is, the subject matter and meaning;
3) the use and relationship of each of the elements;
4) the use and relationship of each of the compositional principles;
5) an evaluation of the composition;
6) a description of the style; and
7) an overall evaluation of the work as a whole.

Students may never again subject a visual statement to such a thorough analysis, but having done it once, they are equipped to use this procedure, or aspects thereof, whenever appropriate. Such analyses have relevance to life experiences such as purchasing clothing, art and objects for the home, evaluating a work space, and finding new living quarters.

The final projects have run the gamut of visual expression: photographic essays, 8- and 16-mm films, videotapes, sound-and-light shows; drawings, paintings, monotypes, assembled sculptures, collages; needlework, costumes, hair designs; environments, including stage sets and a fantasy picnic tent for mosquito-infested Assateague Island; illustrations, graphic designs, and holograms, to name a few. My only regret is that, as a dedicated artist filling the financial gaps with part-time teaching, I never afforded the film to document my student's work. . . .

Requirements of the Instructor

This course is not a "gut" for the teacher. Each week I spent time not only in preparation, but also in going over, correcting and commenting upon the homework assignments of the students. It was a credit/no credit course, and the assignments were evaluated accordingly. Any assignment could be resubmitted at any time for credit. To reduce calls to me, I encouraged students to work together; a class list with phone numbers was drawn up as part of the first class introductions.

Summary

By spanning the full range from the fundamentals to the glories of visual expression, this approach to visual literacy provides a model for teaching a broad audience on a multitude of levels. The course, as outlined, is a fairly personal one, inextricably intertwined with my own teaching style. I encourage its adaptation to different contexts. Both it and my book, **Introduction to Visual Literacy,** are intended to be informative, useful and adaptable to a number of other courses and curricula: as a resource, text, or guide for all studio art classes, art appreciation and art history classes; courses in photography, film, video and computer graphics; and education courses for all levels. It has come to my attention that it is also being used for classes in basic writing and journalism.

By providing both a book and this course outline, I hope that a more visually literate world will become our reality. Please be in touch if I can assist your efforts toward this goal.

Studio: 101 The Cambridge 2967 School House Lane Philadelphia, PA 19144-5204 (215) 438-5759

Creating an Image

Freda Flatt

PURPOSE:

The purpose of the program is to demonstrate different methods through which artists can create images which express feeling about themselves, their fellow human beings, and their surroundings. Through these actions, artists gain personal satisfaction and provide community service.

HOW NEEDS WERE DETERMINED:

Byng School's art students became aware of community needs when they were asked to paint murals for cafeteria walls and for downtown store windows. Their experiences with sculpture resulted from efforts to depict people at work.

OBJECTIVES:

1. Audiences will learn about Oklahoma's heritage.
2. Elementary students will learn about children's literature.
3. Students will gain experience with both commercial and aesthetic aspects of painting and sculpturing.

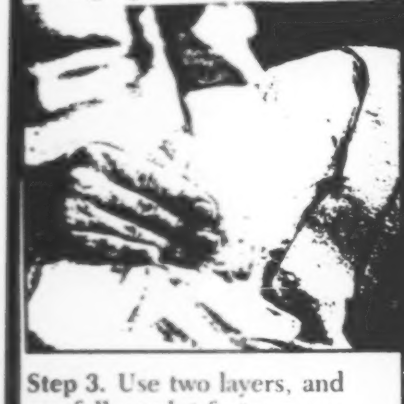
CHARACTERISTICS OF TARGET POPULATION:

Art projects were designed to be viewed and appreciated primarily by the school population (K-l2), but work done in downtown store windows was aimed to appeal to people of all ages. Plaster

CREATING PLASTER SCULPTURE

Step 1. Apply plaster cloth after squeezing through fingers to remove excess water.

Step 2. Rub Vaseline over area to be covered. Begin mask by placing tape over bridge of nose.



Step 3. Use two layers, and carefully sculpt features you wish to emphasize. (Note: Leave area around nose for breathing.)

Step 4. If you sculpt a hand, what position will you pose it in? Will you use props?

Step 5. Let cast harden for 10-15 minutes. (Careful use of 150-watt bulb or hair dryer will speed process.)

Step 6. Cut a seam if necessary, and slowly unmold. Then cover seam with plaster cloth.

MATERIALS

Plastercraft, cloth or Ace bandages, Vaseline, and various props. (Optional: 150-watt bulb or hair dryer)

BEST COPY AVAILABLE

sculpture projects were learning experiences for the art students, but viewers of all ages have enjoyed their efforts.

INDICATORS OF EFFECTIVENESS:

Local community agencies have become aware of effectiveness of art as an attention-getting medium. Students in art classes have become aware that art is a means of gaining aesthetic satisfaction for themselves and their viewers.

We are displaying photographs of two mural projects. Byng's school cafeteria depicts Oklahoma's heritage; Homer's murals are inspired from children's literature. These projects, as well as those of plastic sculpture, have enhanced the image of the art department which resulted in maximum capacity enrollment.

Television, newspaper, and radio have been generous in their coverage of these art activities. State newspapers, as well as *Heritage* magazine, have provided publicity. Much favorable comment has also come from the people outside the school community.

Students are more eager to find various ways of self-expression, and they have become intensely interested in sharing their efforts with the community since we embarked on these projects. Students sparkle with new ideas and are excited about making artistic use of available inexpensive materials.

SOURCES CONSULTED

Carol Barrington, "A Train Buff's Heaven," photographs by Randy Green, *Texas Highways,* February, l983, pp. 36-4l and back cover.

Mondrian, "Working with Abstraction." *Art and Man,* XVII, front cover.

George Segal, "Working with Form," *Art and Man*, XIII, pp. 2-5, and 8-l5.

Computer Generated Graphics in Business, Education, and Medicine

Robert E. Griffin, Mary F. Whiteside, and J. Alan Whiteside

Computer-generated graphics is a dynamic, burgeoning field. Whereas only a few years ago visual materials produced via computer were limited in scope and prohibitively priced, microcomputer graphics is now the fertile soil in which software companies are developing innovative products and from which non-technical computer users are reaping a glorious harvest. The availability of high quality, custom-created visuals that bloom on one's own microcomputer screen is being explored and exploited by professionals in many disciplines.

The purpose of this paper is to describe both the current status and the desired capabilities of computer-generated graphics in three representative disciplines -- business, education, and medicine -- from the perspective of educators/instructional designers. In addition, specific issues and concerns related to the production and use of computer-generated graphics in each field will be mentioned, and at the conclusion of the section for each discipline, software recommendations will be provided.

BUSINESS

Needed Capabilities in the Business Environment

The use of visual materials in business presentations is a complex combination of a quest for high quality visuals coupled with an extreme urgency of time. Simply put, business people want good visuals, artistically created, and delivered very quickly.

Computer-generated graphics actually have their origin in business settings. The first commercially successful computer-generated graphics systems were produced by General Electric, under the trade name Genigraphics, and by another company, Dicomed. These $100,000+ workstations were the forerunners of today's personal-computer-based graphics stations, created specifically to help corporate art departments cope with the need for presentation slides and overhead transparencies. Visual devices produced on these early graphics machines provided high visual quality, fast turnaround, and very little change in the cost of visual production. Early computer graphics workstations maintained the cost of visualization at the $50-$100 per visual price range. This cost was primarily due to the high price tag of those early workstations. The advent of personal computers finally made an impact upon the cost of presentation visuals.

Since the mass introduction of microcomputers into business with the first MS-DOS operating system machines in the early 1980s, business graphics have come of age. Many companies began to produce business graphics software to meet the demands of business people. Business graphics can be described as visual materials fitting into four general visual categories. These categories are: word visuals, graphs, diagrams or flow charts, and maps. Actually, a fifth category of visualization exists called "Other". This category encompasses the remaining visual devices that can not be forced into any of the four previous categories. Most needs for business presentations can be met with visuals from these categories, with the majority of demand being for word visuals and graphs. It is rare in today's business environment that microcomputer-based graphics systems can not meet most of the visual demands of a business presentation.

Desired Capabilities

The previous statement may give the impression that business graphics have developed as far as business people need them to develop, but there are some areas where new capabilities are needed. Of course, new development is always appreciated. There will always be a need for new, larger, and higher quality clip art files for business graphics programs. Most business graphics facilities do not have the time to draw original visual icons for each user's presentation. Borrowing from clip art files is a highly acceptable alternative. Many software companies have begun to fill this desire, but a greater variety of libraries is needed.

Research and development should also continue in the area of color output devices. While the graphics plotter and raster dot film recorder are the color output devices of today, color thermal printers and vector film recorders are gaining popularity. Color laser printers and high resolution digitally-based film recorders may be the output devices of the future.

Another area of growth may be in the computer-based presentation. In this mode, visuals will be prepared and stored on floppy disks and then projected through one of the many video projection devices--without going through the intermediate step of producing an overhead transparency or 2x2 slide. Mass adoption of this type of system is awaiting higher quality color projection devices and the increased availability of the necessary projection equipment in meeting rooms, hotels and conference centers. This form of presentation may eventually replace or reduce the need for more traditional presentation devices, such as slides.

Issues and Concerns

A major issue that all business graphics organizations must confront is how to establish the correct mixture of turnaround time, cost and visual quality. In a business environment, visuals need to be produced in hours, not days. Twenty-four hour turnaround is a common practice in business, and often less time is necessary. That rapid turnaround must be accomplished at a cost significantly less than $50.00 per visual. Finally, the quest for visual quality must be understood. Business people want "good-looking" visuals, but often do not require overly-sophisticated production. As quality production tools become less expensive to acquire, business graphics users will need to reassess their mix of this formula.

Another major issue with business graphics is the requirement that production centers must operate at a break-even or profit basis. Operating and salary subsidies are rare in the world of business. Business graphics facilities will be allowed to grow and flourish if they can pay their own bills.

Specific Software Recommendations

Software recommendations are based on the earlier implied desire for uncomplicated and user-friendly software. Excellent business graphics programs are

- the MASTER series (SIGN MASTER, CHART MASTER, DIAGRAM MASTER, and MAP MASTER) produced by Ashton-Tate
- Diagraph and Picture Perfect produced by Computer Support Corporation
- Freelance Plus, Graphwriter II and Freelance Maps produced by Lotus Corporation
- Microsoft Chart produced by Microsoft
- Harvard Business Graphics produced by PFS Software

EDUCATION

Needed Capabilities in the Educational Environment

There are two distinct educational environments--colleges of education and elementary and secondary schools. Theoretically, these two settings should be similar since colleges of education are training the professionals who will staff elementary and secondary schools. However, the settings are somewhat different because of varying client populations and professional responsibilities. For example, college faculty teach adult learners and are involved in research studies that often require presentations at national meetings, while elementary and secondary teachers' presentations are usually limited to the classroom.

Colleges of education are often the poor step-children in higher education. Shrinking enrollments, caused in large part by a declining student population and the subsequent oversupply of teachers, has meant that many teacher education programs have endured dwindling budgets along with other ignominious difficulties. Consequently, the majority of colleges of education are not overly concerned with cutting edge technology in the area of computer-generated graphics and visuals.

Since the introduction of microcomputers in the 1970s, colleges of education have been struggling to provide hands-on computer time and instruction about computers for their students--pre-service and in-service teachers. This has required the expenditure of large sums of money to establish computer learning labs, as well as significant effort on the part of college faculty to gain expertise in the instructional uses of microcomputers. This process has been mainly an effort to graduate teachers that are computer literate with a secondary focus of providing some computer literacy courses or workshops for in-service teachers. However, as more and more high schools graduate computer literate students, colleges of education are changing their focus in computer training from literacy to helping their students investigate how the computer can be used as a powerful instructional tool.

This new emphasis has left college faculty with little time and even fewer institutional resources to be expended toward the investigation and acquisition of computers and accompanying software programs to generate graphics. The problem is compounded in education, since many faculty have not displayed the inclination to use visuals as tools in their own teaching. Sadly, most education faculty are not ideal role models for pre-professional teachers, especially in the area of mediated instruction. Today many college faculty members use few organizing word visuals or even supporting visuals (map, charts, diagrams, etc.) in their classroom presentations. If visuals are used, transparencies, usually hand-written or typed, xeroxed hand-outs, the chalkboard, and commercial films or videotapes are used most often. When visiting education classes on many college campuses, the observer would find few rooms appropriately equipped for the effective use of transparencies or slides; for example, screens are not available, or are in poor condition, or improperly installed.

Possibly due to the lack of role models in their professional programs, as well as limitations caused by the lack of time and money, public and private school teachers also continue to rely most heavily on the chalkboard with occasional use of commercially produced slide-tapes, videotapes, films and transparencies in their classroom instruction. Many elementary and secondary teachers do not have easy access to the equipment required to use mediated instruction, and even fewer have easy access to computers and related software for generating graphics and teaching visuals.

There are, of course, some exceptions to the scenario described. A few faculty members in colleges of education and a few public and private school teachers are using computers to develop visuals. These are the people who will provide role models for their colleagues and students and who will act as change agents within their institutions. A small cadre of educators is excited about the possibilities presented by the use of computer-generated graphics. As this number continues to grow, there will be a need to identify effective software and hardware, as well as to investigate techniques that will assist in the successful integration of computer-generated visuals. Overall, however, the effect of computer-generated graphics has been quite limited in education.

Since the impact of computers and computer-generated graphics in both environments (colleges of education and elementary and secondary schools) has been marginal, increased acquisition of software programs and computer equipment that will help educators spark their interest in and improve their use of visuals as instructional tools is needed. The types of non-commercially produced visuals that are most commonly used in both settings are transparencies. The types of visuals that are used include a wide variety of charts and graphs, for example, simple pie and bar charts. In addition, many teachers use maps and diagrams to help students visualize specific concepts being taught in science or social studies classes or in college methods courses, for instance. However, the most commonly used visual is the word visual--typically handwritten or typed.

The educational environment is usually a "do-it-yourself" situation; faculty are accustomed to developing their own hand-outs and teaching tools, including visuals such as overhead transparencies. In addition, most educational environments lack adequate support staff to provide more than a modicum of assistance to teachers. Therefore, one of the most important criteria for the computer tools that produce graphics is ease of use by non-professionals (artists). Educators at all levels need to be able to use such tools to produce their own visuals. Thus, the software must be capable of easily and quickly producing the types of visuals needed. Ease of use and time required to develop are two very important criteria. Typically, teachers want to be able to produce charts, graphs, or maps, with little preplanning. Usually, faculty want to be able to sit down just hours or even minutes before their presentation and produce a few visuals that will help them illustrate important or difficult concepts.

At the present time, most educators do not have extremely high expectations about the level of quality for the graphics materials being produced. Since they are accustomed to using handwritten or typed visuals, even some of the most rudimentary types of graphic output is a significant improvement. However, as educators see more and better quality computer-generated graphics, they will begin to demand better quality from the packages they are using. Most educators currently are satisfied with software and hardware that produce neat, readable text and simple charts and graphs in a dot matrix format.

Desired Capabilities

The attributes of graphics software that educators would like to see available in the short range general include ease of use, ease of importing clip art and other types of drawings and pictures, and, of course, decreased costs for both software and hardware.

An important area where more flexibility is required and where cost is a big factor is the method of printing computer-generated visuals. Even though laser and dot matrix printers, as well as plotters, can produce high quality output, compatibility with a wider variety of these peripherals is a necessity. In addition to being able to produce hard copy output, more and more faculty will be interested in using equipment being developed to project a chart or graph directly from the computer to a large screen.

In the long range, given that the use of computer-generated graphics continues to increase, desired capabilities might include ways of easily producing color transparencies, and software that is easier to use for computer-driven slide-show-type presentations (using, for example, PC Storyboard). Continued improvements in printing capabilities, and improved means of projecting computer-generated screens also will be requested.

Issues and Concerns

One of the biggest issues related to the use of computer-generated graphics in the educational environment is finding software that will increase the use of visuals by elementary and secondary teachers and college faculty. In order to accomplish this, an interest in visualized instruction needs to be cultivated in educators in these settings so that they will see the value in developing visuals. These people also will need to be trained in the use of computers as well as in the use of software designed to produce maps, charts, graphs and word visuals.

Secondarily, increasing the use of visuals is closely related to user access to the hardware and software required for producing computer-generated graphics. In the educational setting, equipment and software should be readily available so that users can develop their own materials easily and quickly. Since the prevailing atmosphere is most often one of do-it-yourself, easy and immediate faculty access is important. However, this does raise the issue of quality control. Training should include discussions of producing visuals that meet specific standards of quality for clarity, simplicity and legibility.

These concerns place certain constraints on the types of hardware and software that are purchased. When the acquisition of software is being considered, packages should (1) be easy for unsophisticated users to learn and to use, (2) produce only output that meets established standards and (3) be reasonably priced.

Specific Recommendations

Since word visuals are among the most commonly used visuals, the first software that should be purchased is a package that will quickly and easily produce acceptable quality word charts. These include

- Pyxel Visuals (dot matrix)--Pyxel Applications, Richmond, VA
- Overhead Express--Business and Professional Software, Cambridge, MA
- Microsoft Word coupled with a laser printer and downloadable fonts in appropriate sizes
- Present It!--Pyxel Applications, Richmond, VA

Other packages that would be useful in colleges of education and/or in elementary and secondary schools include the following

- CHART MASTER, MAP MASTER
- Picture Perfect
- Diagraph
- PC Storyboard

MEDICINE

Needed Capabilities in the Medical Environment

The environment in most colleges of medicine is an interesting blend of the characteristics of business and education settings with some additions created by the clinical setting. Faculty do teach as in business and education. However, in the typical medical school, the first two years are primarily given to didactic teaching, with the last two years focusing on small group and bedside clinical teaching situations. The preclinical curriculum is "lockstep" in nature--virtually all students take the same courses at the same time. These courses are normally presented once a year to large groups that include, for example, all 150 freshman students. Faculty in the basic sciences (anatomy, physiology, biochemistry, etc.) typically are responsible for only a few lectures in their department's course. Most do not have responsibility for an extended series of lectures throughout the academic year.

Clinical education is half of the educational experience of medical students and consequently very important. In the clinical courses, fewer lectures are given, and students progress through the curriculum in small groups. They are expected to gain information in ways other than sitting in an amphitheater during a lecture. The clinicians (M.D.s) have clinical teaching responsibilities similar to supervising student teachers or business interns.

Teaching is not the only task for medical school faculty, and often it is not the one most valued by the administration. Faculty members have strong commitments to and responsibilities in the areas of research and patient care. Most medical schools depend heavily on externally-funded research grants and on income generated by patient care facilities. National recognition among their peers is critical. Therefore, as in colleges of education and business, faculty are expected to make presentations at major conferences each year. For many medical faculty, presentations about their research are of major importance because this how the reputation of individual researchers and, in fact, of the institution as whole is maintained. Faculty members are also expected to make occasional semi-formal presentations to departmental colleagues (grand rounds) which present other opportunities to use computer-generated graphics.

Medical education is a visually oriented field, and ripe for high quality computer-generated visuals. Recognition and manipulation of visual images is a critical skill for faculty and students alike. Visual sensory information bombards students in gross anatomy (visualizing what a portion of the body looks like from a particular perspective), and they must recognize the structures of complex molecules in biochemistry, identify certain microscopic features of human tissue, and visualize the interconnections among the various systems of the body.

Thus, almost every lecture and presentation is (or should be) mediated with slides, transparencies, and/or videotapes. Some diehard faculty still favor hand-drawing detailed anatomical structures on a blackboard with colored fluorescent chalk before class! The type of output needed in the medical education environment is extremely varied and ranges from simple word visuals to diagrams of molecules, from bar and line charts depicting research data to realistic anatomical drawings. Because of the complexity of the material, medical faculty are famous for producing extremely intricate charts and diagrams.

Most medical college faculty are not faced with severe budget constraints or with an extreme shortage of support personnel. So, they are accustomed to giving the task of developing visuals totally to a graphics or media department. At the very least, they expect to have a competent secretary or administrative assistant who can develop or assist in the development of visuals. This is more true in clinical (money-making departments) than in basic science departments, however. Even though some faculty are interested in computers and do produce their own graphs and charts, most can not spare the time to do so. Basically, this means that production of visuals is done by professionals or by someone other than the faculty member.

Medical faculty tend to expect a high quality product from their graphics software. This expectation is based upon experience with a graphics department that includes professional medical illustrators and exposure to extremely well-produced print visuals in textbooks and journals. However, there is a dual standard operating in this environment; faculty want the highest quality visuals possible for outside presentations, but often they are willing to take whatever they can get for visuals used in their classes. A mixed quality is evident in the visuals used for teaching in a given class session. A typical lecturer may use both extremely high quality professional slides to poorly produced handwritten or typed transparencies.

Desired Capabilities

The wishes of medical school faculty can probably be summed up in three words--more, better, and soon. Most faculty are accustomed to dealing with the issue of needing some lead time for the production of slides and transparencies. However, there is a continual struggle between the graphics/media department that requires four or five days or longer to produce visuals and the faculty member who needs something "right now." Cutting down on lead time for the development of graphics is an important priority. Cutting the cost of custom-produced visuals is also becoming a priority, and eliminating the necessity of expensive artist's time would be welcomed. If the faculty member produces his or her own visuals using computer-generated graphics, flexibility is a key. Faculty members want software packages that will produce many types of charts and graphs with the capability to include scientific notations and symbols. Better quality and the ability to consistently duplicate previous visuals are always desired.

The capability of producing high quality graphics that can be directly incorporated into videotapes or overlaid onto a video image from a videodisc is rapidly becoming a necessity. Medical schools and individual practitioners are constantly producing teaching videotapes for students and colleagues. The utilization of sophisticated computer-generated graphics (beyond character generator type word visuals) could significantly improve the effectiveness of these teaching tools and make them more marketable.

Improved and less expensive software and hardware for freeform drawing is also desired in the medical school environment. Medical illustrators would use these tools to produce visuals more quickly and efficiently.

For the long range or even not-so-long range, many medical schools are also investigating providing workstations for faculty to design some of their own visuals, especially those simple visuals that are needed quickly for an upcoming class. These would be sent electronically to the graphics department and produced. Implementation of such a system could provide faculty with more flexibility by decreasing turn-around time. If requested by the faculty member, assistance from the graphics department would be provided for the design of complicated or sophisticated graphics.

Software that will allow faculty to produce and present high quality three dimensional images, for example, a lung or sections of the brain, also are desirable. With the advent of CT (computed tomography) scans and MRI (magnetic resonance imaging), physicians have become sensitized to the possibilities of computer modeling. Functions similar to those in CAD (computer-aided drafting) packages including three dimensional rotation and zooming in on details would be very useful in demonstrating, for instance, a functioning heart. Such a capability would allow users to easily draw and manipulate images on the screen so that students could view them from a variety of perspectives. Given the influence of animal rights groups, the ability of software packages to model physiological events might become indispensable, since such processes are usually demonstrated with living animals.

Finally, faculty are becoming more interested in better large screen projection systems. The Electrohome-type large screen projectors and the current overhead projector based systems do not produce high quality images. These systems are currently not acceptable for use in classroom or for formal presentation situations where high quality graphics are required.

Issues and Concerns

In an environment in which academic freedom is actively guarded, the philosophical biases of an instructional designer or media professional need to be supported with hard evidence. For example, one of the problems that seems to be inherent in the medical environment is the propensity to design visuals that are extremely complicated and crowded. Packages that enable either faculty or the graphics department to produce three dimensional charts and graphs could lower the visual quality of some presentations. But who decides whether visuals of this type are produced or not is a sticky issue.

An important concern is how to increase the use of higher quality computer-generated graphics in the classrooms. The concerns over user access and control will probably be resolved by cooperative projects between faculty and the media/graphics staff. This cooperation may provide some spillover so that as high quality computer graphics are available and being used for formal presentations, they may be used more frequently in the classroom.

In general, the facilities and budgets of medical schools provide support for the continued and expanded use of computer graphics software packages. Traditionally, medical educators expect relatively high quality visuals, and as computer-generated graphics can contribute to that tradition, they will be relied upon increasingly.

Specific Software Recommendations

Word visuals is one area that needs improvement in medical education. The availability of easy to use software is needed.

- Microsoft Word with laser printer and downloadable large size fonts
- Present It! (IBM/compatible computers)
  predesigned formats for word visuals and simple tabular data; supports dot-matrix and laser printers

Other software packages:

- Diagraph and Anatomy Clip Art Library (IBM/compatible/HP computers)
  (Computer Support Corp.)
  (educational discount)
- Picture Perfect for charts and graphs (IBM/compatible/HP computers)
  (Computer Support Corp.)
  (educational discount)
- CHART MASTER (IBM/compatible)
- Graphics 100 (HP 150 computer)

Conclusion

Computer-generated graphics have moved from the world of business to many other fields, bringing advanced capabilities for creating visuals to many types of professionals. Graphic materials are no longer being created solely by artists, but increasingly by non-technical computer users. While this situation has brought many advantages (direct control, quick turnaround, almost instantaneous translation of raw data into easily comprehensible charts and graphs -- to name a few), it is certainly possible to misuse the tremendous capabilities of today's graphics software packages. Just because a package will produce three-dimensional pie charts does not mean that capability should be utilized.

However, computer-generated graphics programs do offer significant benefits to professionals in various fields who need high quality, custom-created visuals that are quickly produced and affordable. Helping users integrate visuals of this type into their conference presentations may lead to greater use in classroom situations, and this is to be desired. As products and users become more sophisticated, the uses for computer-generated graphics are likely to increase. Thus, as tools for facilitating communication, computer-generated graphics have a bright future.

Microcomputer Graphics: The Production of 35mm Slides and Transparencies for Teaching and Research Presentaions

J. Thomas Head

Abstract

This presentation describes the basic components of a graphics work station, identifies the variables used in evaluating and selecting graphics software packages which will produce hard copy output suited to the user's needs, and provides a wide range of examples of the quality of output from a variety of hard copy devices. The most highly rated products for the IBM PC are discussed and examples of output in the form of paper plots, overhead transparencies, and 35mm slides from these top-rated programs are presented.

I. Microcomputer hardware for a graphics work station

Central processing unit (CPU)

The CPU of the computer is a major factor in determining the speed at which any given graphics software produces the images you are producing. For example, the IBM PC AT (80286 microprocessor) is two to three times faster than the IBM PC (8088 microprocessor). The new 80386 microprocessor-based machines will set new standards for productivity. Of course, speed is also a function of the complexity of the software and the ingenuity of the programmer who wrote the package.

Color display

The computer's color monitor allows you to preview your graphics in color before producing slides, prints, or other types of hard copy. The resolution of the monitor is usually less than that of the final product, but is sufficient for editing purposes. The IBM enhanced color monitor when driven by the enhanced graphics adapter (EGA) provides a significant improvement in resolution over the original CGA monitor. The new IBM VGA monitors provide up to 256 colors which is a great advantage when designing complex images.

Program and file storage

A hard disk provides a real advantage for both operation of the graphics program and for storing graphics files produced. Many graphics programs require several floppy disks and a hard disk eliminates tedious disk swapping and speeds up disk access that is often required when the program is running. Files are accessed at least five times faster on hard disks compared to floppies. Image files can be stored on floppy disks or on a hard disk, but users are strongly advised to create a backup file on a floppy disk for security purposes especially for complex images that require extensive production time.

Output devices

Printers

Dot matrix printers are the most common and least expensive. These impact printers create an image by hitting a set of hammer-like pins against a ribbon which transfer ink to the paper and are useful for printing overhead transparencies masters in black and white. The 24-pin printers produce a significantly higher resolution image than the older 9-pin printers. The reduction in cost of the 24-pin printers has made them an excellent machine for high quality printing with low maintenance costs.

Thermal printers are a rapidly improving technology which creates an image in color by melting a wax-based ink from the ribbon or transfer sheet onto paper. These printers produce a wide array of colors at 200 dots per inch in 1-2 minutes and provide high quality overhead transparencies and paper copy.

Ink jet printers print in an array of colors by spraying ink directly on the surface of the paper or transparency. These are relatively slow and provide approximately the resolution of dot matrix printers but with a wider range of colors. The early problems with clogging of the ink jets has been reduced on the latest models.

Laser printers are laser-based electrostatic devices. The image is created by writing on a copier drum using a laser-light beam that operates under computer control. Once the image is created on the drum, these copiers operate much the same as an office electrostatic copier and provide a resolution of 300 dots per inch. The dramatic reduction in price of these devices has made them very popular for production of high quality black-and-white images. There have been predictions of color laser printers for the last couple of years, but no cost-effective models have been released as yet.

Plotters

Plotters provide the highest resolution for direct production of paper copy and overhead transparencies. They use a variety of pen types in a wide array of colors. The image is created by vector commands from the computer which eliminate the jagged effects of a pixel-based system. Plotters are very slow in producing complex images and the pens tend to dry out rapidly, making them unusable.

Film Recorders

Film recorders, which use color film as the output medium, have potentially the highest resolution. High quality cameras currently have better than 4000 line resolution which exceeds the resolution of the film in many cases. These recorders provide potential of up to 256 colors in a given image from a palette of several million. The actual number of colors is a function of the software. The formats available include 35mm up to 8 X 10 inches.

II. Computer graphics software

Cost

The cost of graphics software covers a wide spectrum from less than fifty dollars to thousands of dollars (when it is included aspart of a sophisticated graphics system). The low cost software ($50-$500) is quite versatile and allows the user to produce slides and transparencies on a limited budget. However, the user ultimately has to determine the acceptable level of quality and the cost-effectiveness of these products in his/her particular situation.

Ease of use

The ease of use depends on such factors as documentation, help menus, data input, speed of image generation, and the ability to do batch processing in the production of graphs. A package should be tested by the user prior to purchase to gauge its ease of use.

Quality of output

The quality of slides and transparencies produced depends not only on the software, but also on the output device. Most software packages produce comparable quality on printers and plotters with some relatively minor variations.

However, the number of software packages which are capable of driving the wide range of cameras on the market is increasing rapidly. The resolution of these cameras ranges from approximately 400 to 4000 lines. Driver software is available for many of these packages which allows their use with higher resolution cameras. This development has great potential to enhance the quality of slides being produced by such relatively low-cost software.

Power

The power of a graphics software package is a function of such factors as the number of types of graphs which it can produce, the ability to graph data in a variety of formats without the user having to reenter data from the keyboard, editing features, and the number of colors available in a single graphic.

III. Productivity

Computer graphics systems have great potential to improve productivity and to enhance the communication process across business and education. These systems enables the media specialist or graphic artist to design graphs and charts rapidly and in a multitude of colors. Many of these graphs would be too time-consuming to be cost effective if they were produced by traditional methods. Computer graphics can also be created by educators at their own desktop computers to prepare teaching materials to be used directly or enhanced by the graphic artist.

IV. Comparison of slides and transparencies

The slides and transparencies presented in the demonstration were prepared on an IBM PC AT (640K memory/enhanced color graphics adapter) using software ranging in price from approximately $35 to $500. The output devices included a dot matrix printer for production of masters for thermofax transparencies and a plotter for the direct production of transparencies. A color image recorder was used for the 35mm slides.

The software packages used in producing the demonstration materials are described below. (The prices given are list prices. Most software is available at substantial discounts from mail order houses.)

PC Crayon

PC Software, 9120 Gamercy Dr., SanDiego, CA 92123

List Price: $35

The "etch-a-sketch" of graphics software provides basic graphic shapes such as line, circle, box, arc and nine text fonts. An easy-to-use package that provides a good introduction at a bargain price. Supports dot matrix printer only, but images that are stored may be produced as 35mm slides with the Polaroid Palette.

PC Paint

PC Software, 2336 Walsh Ave., Santa Clara, CA 95051

List Price: $99

Provides for production in color of freehand illustrations as well as a variety of hollow and filled graphic shapes from "tool box" menu by means of a mouse. Text is available in five fonts and three styles. Supports printers and plotters, and the latest version (2.0) has a driver for production of 35mm slides with the Polaroid Palette.

Overhead Express

BPS Software, 143 Binney St., Cambridge MA 02142

List Price: $195

Provides 12 templates for quick creation of overhead transparency masters on dot matrix printer. Templates can be easily customized. On-screen preview, help, and error detection.

Sign-Master

Ashton-Tate, 25 Sylvan Rd., Westport, CT 06880

List Price: $245

Provides text/word charts and tables in six fonts and 16 sizes. Supports a variety of plotters and printers for output as paper and overhead transparency masters, and the Polaroid Palette image recorder for 35mm slide production. New version 5.1 creates improved quality Helvetica-like typefaces.

Chart-Master

Ashton-Tate, 25 Sylvan Rd., Westport, CT. 06880

List Price: $375

Provides clustered and stacked bar and column charts, as well as line, scatter, high-low, area, and pie charts. Supports a wide variety of printers and plotters and the Polaroid Palette. New version 6.1 supports printers in special "high-res" mode which is twice normal resolution.

Diagram-Master

Ashton-Tate, 25 Sylvan Rd., Westport, CT 06880

List Price: $345

Provides organizational and gantt charts as well as the capability to produce free-form diagrams. Supports a wide variety of printers and plotters for output on paper and overhead transparencies and the Palette image recorder for 35mm slides.

Microsoft Chart

Microsoft Corporation, 10700 Northrup Way, Bellevue, WA 98009

List Price: $295

Provides the capability of creating over 45 varieties of charts by direct data entry or importing data from other applications. Supports over 70 printers and plotters, the Polaroid Palette, and high resolution film recorders. This is a comprehensive business graphics program that is not copy-protected.

Graphwriter

Lotus Development Corp., 161 First St., Cambridge, MA 02142

List Price: $595

One of the most powerful packages available, but requires 2.3 megabytes of hard disk storage for both the basic and extension set. Provides column, bar, line, regression, pie, gantt, organization, bubble, surface-area, and text/word charts. Supports a variety of printers, plotters, the Polaroid Palette, and high resolution film recorders. A new version is due to be released in the fourth quarter of 1987. Early reviews of test copies indicate that it will provide over 24 different types of charts, automatic updating of a series of charts when linked to a Lotus 1-2-3 spreadsheet, and can incorporate drawings from Freelance Plus. It can also read dBase, ASCII, DIF, and SYLK files.

Freelance Plus

Lotus Development Corp., 161 First St., Cambridge, MA 02142

List Price $495

A powerful graphics package which provides for the creation of horizontal and vertical bar and stacked bar charts, line, pie, and xy(scatter) graphs. It is very versatile in creating freehand drawings, logos, and other graphic elements. Basic objects that can be created and manipulated include text, lines, arrows, rectangles, polygons, circles, arcs and markers. It can be used to modify the basic graphs created by Graphwriter as well to enhance Lotus 1-2-3 and Symphony .PIC files. Provides the ability to read ASCII files for creation and modification of text charts. Supports a wide range of printers, plotters, laser printers, and high resolution film recorders which allows the user to obtain high quality 35mm slides.

Harvard Graphics

Software Publishing Corp., P.O. Box 7210, 1901 Landings Dr., Mountain View CA

List price: $395

Provides standard bar, line, pie, and text charts. Mixed charts may contain any of these types on the same image. Annotation function provides versatility in editing graphs. Imports data or graphs from Lotus 1-2-3. Supports a wide variety of printers and plotters for output to paper and overhead transparencies. The output from dot matrix printers is excellent when "high resolution" mode is selected through the software. Also supports the Polaroid Palette and high resolution film recorders.

Lotus 1-2-3

Lotus Development Corp., 161 1st Street, Cambridge, MA 02142

List Price $695

This popular spreadsheet package provides line, bar, xy(scatter), and pie charts (latest version includes exploded pie). Supports a variety of printers and plotters and graphic images may be PSAVED for production as 35mm slides with the Polaroid Palette. In addition, graphic images stored as *.PIC files are compatible with the high resolution graphics system used by the LRC to produce slides and overhead transparencies. The greatest advantage over other packages, which provide only graphics, is that it allows practically an unlimited number of data entry points, and it may also be used for other functions such as financial and statistical analysis and data base work.

PC-Slide

Management Graphics, Inc., 1450 Lodestar Rd., Toronto, Ontario, Canada, M3J3C1

List Price: $3000

A complete service center software system which provides automated file transfer via modem allowing the center to image customer files from remote locations. The manager software creates a header slide with customer information and automatically runs a series of jobs unattended. The basic production package, Slideworks ($249), provides all the design capabilities needed to produce high resolution 35mm slides. It is an easy-to-use product which is useful for production of 35mm slides. It provides the capability of creating text slides, bar, line, pie, and table charts. It allows the mixing of bar and line graphs in the same chart. Basic objects that can be created and manipulated include text, lines, polygons, circles, ellipses. The text charting function has a nice feature which warns users when they have entered too much information. Provides the ability to import ASCII files for creation of text charts. Supports a limited number of dot matrix printers, laser printers.

V. Conclusions

This paper provides a brief overview of computer graphics on the IBM PC. The majority of the generalizations regarding work stations and hard copy devices are applicable to IBM compatibles and even to other systems such as Apple computers.

The great number of computer graphics software packages available for microcomputers precludes the feasibility of personally evaluating all of these packages. The software evaluated in this presentation is representative of the wide array that is available. Several excellent reviews (e.g., Long, 1987 and Needle, 1986) provide guidance in selecting those which may meet your particular needs. Users should also try to get preview copies or go to the local computer vendor to "test drive" those which are of interest and are compatible with their computer systems.

References

Alesandrini, K. Graphics: A two-edged sword. ***PC Magazine,*** 1985, 4(12), 239-261.

Cuellar, G. A bar chart for all reasons. ***PC Magazine,*** 1985, 4(13), 213-224.

Braue, J. Corporate hit parade: Top 20 Programs. ***Computer Decisions,*** 1985, 17(5), 30.

Foley, J.D. & Van Dam, A. ***Fundamentals of interactive computer graphics.*** Reading, Massachusetts: Addison- Wesley, 1982.

Gates, M. Computergraphics: Slidemakers supreme. ***Audio-visual Communications,*** 1985, 19(4), 36-63.

Goldberg, C.J. & Kunkel, G. Charting a course through graphics software. ***PC Magazine,*** 1987, 6(5), 113-117.

Goldberg, C.J. & Kunkel, G. Graphics software on display. ***PC Magazine,*** 1987, 6(5), 119-243.

Rosch, W.L. Wipes, pans, and fade-outs: Animating your business graphics. ***PC Magazine,*** 1987, 6(5), 247-270.

Hart, G. Adding a touch of color (24 plotters: $399 to $5950). ***PC Magazine,*** 1985, 4(26), 108-140.

Hutzel, I. Trends in PC paint system development. ***Computer Graphics World,*** 1985, 8(3), 47-58.

Machrone, B., ed. Business Graphics: Giving power to presentations. ***PC Magazine,*** 1985, 4(12), 110-237.

McGrath, R.A. Affordable graphics: A Micro-based system for plotting and slide production. ***Computer Graphics World,*** 1984, 7(11), 29-36.

Long, R. Presentation graphics. ***InfoWorld,*** 1987, 9(38), 55-58.

Needle, D. Presentation graphics software. ***InfoWorld,*** 1986, 8(38), 35-46.

Petrosky, M. Presentation Software Sales Up. ***InfoWorld,*** 1985, 7(27), 34-37.

Rasmussen, P.M. Computergraphics: The softer side. ***Audio-visual Communications,*** 1985, 19(6), 29-32.

Tufte, E.R. ***The visual display of quantitative information.*** Cheshire, Connecticut: Graphics Press, 1983.

Nurturing Photgraphic Creativity While Maintaining Individuality

Deborah L. Raymond

This is a description of techniques which motivate community college photography students, the types of assignments which challenge them, and a classroom management style which builds the self esteem of the individual students and develops a sense of community between the students.

When students decide to enroll in a photography course, they usually have a goal in mind. Perhaps they have been running around since childhood with simple cameras snapping pictures of anything and everything. They want to take better pictures. Perhaps a sophisticated camera has just been received as a gift and want to know how it works. Perhaps a photography class helps them to meet graduation requirements. Perhaps their hobby is model boats, trains, etc., and they want to take pictures of their products. Perhaps they are about to retire and are looking for a hobby. Perhaps they have a job in which knowledge of photography will be helpful or is required. The list goes on and on. All are valid reasons to enroll in a photography class.

There is no reason why students should not reach the end of a photographic course feeling that it was everything that they had hoped it would be and more. Unfortunately, all too often educators who are involved in creative areas ignore the needs and desires of their students. These educators try to mold their students' works into the styles of those who have been recognized as masters in the field, or worse yet, into the style of their instructor. While trying to emulate the masters, the students ignore their own interests and this is reflected in their lackluster results. What follows are considerations and approaches to avoid this situation while motivating the students to discover their photographic potential.

Begin with introspection. Before photographic instructors step into the classroom, they need to have put their own background into perspective with regard to the class that they are about to teach. Instructors who have doubts about their own skills will find that this affects not only how they interact with their students, but also the quality of the work that their students produce.

Community education classes frequently offer courses in, "How to take good pictures." The person teaching these courses needs to be able to structure the teaching of the elements of well-composed and exposed photographs to guide the students to success. To determine if the students have been successful, that instructor must possess critical viewing skills and be able to communicate and teach them to the students.

The person who teaches a credit photography course which includes darkroom work has an even greater responsibility. In addition to composition, exposure and critical viewing skills, the instructor must be able to teach developing and printing and to help the students fine tune these skills as they are learning them. As students learn the effect of varying the exposure times and f/stop openings on their prints, it helps them to comprehend how shutter speeds and f/stop openings effect the exposure of their film. Telling a student that a print is too light or too dark will only frustrate that student unless it is accompanied by specific suggestions about how to improve the print. If the instructor has not spent enough time in the darkroom to be able to do this comfortably, then it is time to begin to do so. The instructor must be able to trouble-shoot. If a student is having a problem, was it precipitated by the camera, the developing, the printing, or a misunderstanding or error by the student?

Darkroom photography courses begin by dealing with black and white. Before the semester is finished, students will begin to have questions about color. This may be the only photography class that they ever take. They want to know how what they are learning relates to the color photographs which they normally take. What are the differences between different types of color film? Can they process it themselves? How can they use their electronic flash for the best results? How do filters effect their film? How do all of the new electronic cameras work? This information can all be incorporated into the course.

Students will come from diverse backgrounds. They may have had a year or more of photography in high school. That may have been last year or ten or twenty years ago. They may have never handled any camera other than an Instamatic. An informal interview of the students during the first class meeting where each student explains his photographic background, type of equipment, interests, and reason for taking the class, is helpful to the teacher as a quick method of evaluating the distribution of the skill levels among the students. This also allows other students to discover which students share common interests.

Now that the group has been defined, the students must be instructed, motivated, and challenged. Beginning with the technical basics, the students are taught about shutter speeds, f/stops, and depth of field and how they interrelate. They learn about film, its characteristics and its exposure. Through demonstrations and mediated presentations they become familiar with the variations between different focal lengths of lenses. These initial presentations are given in large group settings. Following mediated presentations, students are informed where the presentation can be found for additional reviewing. (A listing of some of the commercial slide-tape programs which are appropriate have been included at the end of this paper.)

The students are now about two weeks into their photography course (based on a schedule which allows two two-and-a-half hour sessions per week). It is time to discuss composition. The session begins with the viewing of Kodak's slide-tape presentation, "The Beginnings of Good Composition." Students have brought in photographs that they feel are representative of good photography. Each photograph is discussed by the group using the compositional criteria established by the slide-tape program.

The final exercise is a composition game. The class is divided into groups of three. Each group is given a packet which contains pieces of felt: a black square which measures ten inches on each side; two one-inch white squares; two white squares which are two inches on each side; two five-inches by three-eights inch strips; two two-inches by one-half inch strips; two one-inch by one-half inch strips; a gray triangle; and an orange circle. The challenge of the game is to design by committee. During the first round, they can only use the white pieces. They can use some of them, all of them, overlap them, bend them, etc. The only limitations are the number of pieces, the dimensions of the black felt square, and their imagination. Between rounds, students circulate to view the designs of the other groups. During the second round, the recessive gray triangle is either added or the design is reworked to accommodate it. The aggressive orange circle is added as an element for the final round. The students experiences during this exercise are discussed upon its completion.

Now, it is time for the first assignment which involves taking pictures. The assignments are structured to have the students look at the various elements which comprise good photographs. They do not force the student to photograph specific subject matter. During a sixteen-week semester, there are eleven different assignments. The first eight deal with elements; the last three are designed to be creative, stimulating and challenging.

Some examples of a typical semester's assignments are:

1. Bracketing: Shoot the same subject five times: once at the normal exposure, one stop over-exposed, two stops over-exposed, one stop under-exposed, two stops under-exposed. (As an initial assignment for beginning students, this assignment is not oriented specifically toward the Zone System. It does serve as a lesson in the importance of proper exposure and its relation to the final print. It serves as a check on the student's comprehension of the technical elements of shutter speeds and f/stops. It also provides some insight into their compositional styles. Operational problems with the student's camera may also become apparent.)

2. Shoot the same subject from three angles. The subject is the choice of the student. Explore the picture and see how it changes as the angle changes. Do not be satisfied with the first shot.

3. Lines, shapes, and patterns. Lines lead. They create shapes and patterns. Shapes are the form of objects and the spaces created between them. Often, shapes are patterned. Many shapes repeated become a pattern. Students should photograph these elements in their chosen subjects.

4. Lighting. The way a photograph is lighted can define the subject. It can shape it and pattern it. Light creates the mood of the picture. Observe the quality of the light. What is its direction?

5. Texture. Look for subjects with interesting textures. Visually describe their surfaces. What characteristics do they possess? Do they present a pattern to the eye? Are they tactile?

6. Subtle gradations of gray. When people squint their eyes, they find that bright objects are more distinctive while dark areas seem to disappear. Between the light and the dark there are a whole range of subtle gradations of gray. Take advantage of this range. (This is a great assignment to photograph on Panatomic-X and process in a Rodinal dilution of 1:50. It has an incredible gray range.)

7. Portraits. Karsh said that there is an "elusive secret that hides inside of everyone and it has been my life's work to try to capture it." This is the challenge to the students.

8. Abstractions. Demand that the viewer look more than once to understand the image. Keep in mind all of the compositional elements of the previous investigations.

9. Create for the senses. Photography is a visual medium, but vision is only one of the five senses. Try to create photographs which the viewer can hear, taste, touch, and smell as well as see.

10. Interpretation X 3. Photograph a subject which can be interpreted three ways, or perhaps, a subject which has been interpreted by an artist and that interpretation can be re-interpreted. (Example: a horse, a carousel horse, a photographic reinterpretation of the carousel horse.)

11. Reflections. The image of one object reflected in another is the obvious response. But, maybe a person is being reflective or the past is reflected in the present or future.

The students must use at least one twenty-four exposure roll of film. They are welcome to take as many rolls of pictures as they feel are appropriate. If they are dissatisfied with their results, then they have the option to reshoot the assignment. A proof sheet is required from each assignment. It is reviewed by the instructor; cropping is indicated with a grease pencil and the photographs are discussed with each student. This provides the feedback to help the students develop their own critical viewing skills. They are encouraged to ask questions, to try new techniques, to succeed or even fail. They are always allowed to try again.

Starting with the first photographic assignment, only about one hour per week is spent lecturing to the large group. One class period is devoted to instruction and practice of developing film, another to the printing process. Students are given handouts, and the walls are posted with color-coded guides explicating the processes. The instructor now monitors the darkroom activities. The rest of the time is spent working with individuals as their proof sheets are examined and their print quality is critiqued. The students take the responsibility for structuring their own time. They can develop film, make prints, mount prints, take a break. Students are encouraged to interact with each other. As they develop confidence in their critical viewing skills, they begin to share them with other students in the class. They take the techniques for cropping and evaluating print quality that they have been learning from their instructor and help other classmates to critique their products.

Students establish their own standards of quality through assignments which address the elements of good photography while allowing them to work in their own style and involve their own interests. The technical skills of developing, printing and mounting become means through which the students communicate. They quickly realize that the quality of the finished print is proportional to how well the image is conveyed.

The course is designed to meet the needs of the students and to make them feel good about their photography. In the process, their self esteem is built. That is not to say that students are always satisfied with their results. When a student looks at a proof sheet and decides that the pictures are not working, that is the time to review the proofs with the student and determine what the problem is. Individualizing the instruction allows this to happen.

Three mounted prints are required at midterm; six additional mounted prints are required at the end of the semester. Each is graded on the quality of the printing (good contrast, focus, dust-free, a black, a white, and an appropriate gray range) and on the quality of the image (composition, effective use of the elements of photography which they have studied, focus, appropriate depth of field, and originality). Students select the prints which they feel are their best. These are shared with the class in a group critique.

The structuring of a photographic course in this manner has evolved through six years of practice and experimentation as a photographic instructor. The assignments change to meet the needs of the group. However, the introduction of compositional elements is always included. Assignments are open-ended to encourage creativity and to allow the students to be motivated by their personal interests. Mediated presentations provide visual examples of good photography, as well as, facilitating the education of visual learners. Large group presentations are kept to a minimum because the self esteem of the students is built during the individualized sessions. Students are not sent out on photographic assignments until they have been introduced to the technical and compositional basics. When they return with the results of their assignments, they are supported through the individualization of the course. The standards and expectations of the instructor are high, and those standards are communicated to the students. They are reflected in the products of the students. It not unusual for the results to amaze both instructor and the students. Frequently, students are surprised to discover that they do not have to go to somewhere more scenic than their local community to produce interesting, effective and creative photographs. There have even been students who have enjoyed the course so much that they have enrolled for another semester.

The text used for the course is well illustrated and gives good basic information presented in easily understood terminology. It is

Barbara London Upton with John Upton (1985). Photography (3rd. ed.).
Boston: Little, Brown and Company.

Commercially produced slide tape programs which have proved helpful illustrating concepts are

From Eastman Kodak, Rochester, NY
"Beginnings of Photographic Composition," 1984
"Effective Use of Lenses," 1982
"Imaginative Use of Filters," 1981
"Existing Light Photography," 1984
""Using Flash Effectively," 1984

From Media Loft, Minneapolis, MN
"Thinking Photographically," featuring Henry Sandbank
"Time, Place and Subject: Responding to the Moment," featuring Burk Uzzle
"Point of Departure: Developing a Creative Approach to Photography and Its Publication," featuring Ralph Gibson

The Photograph: An Icon of Violence or Peace?

Martin Oudejans

In the context of an earlier conference theme, "Visible and Viable", I would like to discuss with you the role of the photograph in modern society. We all have heard the many praises bestowed on the photographic medium, especially for its contribution to the rapid progress in western civilization.

Regardless of its relatively short history -- approximately 150 years -- photography has reached a very powerful position in society. This is not an overstatement on my behalf when we consider the fact that modern society would not be able to survive in its present structure without the photographic invention. I will discuss how photography's specific characteristics made this all possible. We are familiar with the medium's popularity. Very little do we know about the fact that photography has changed our perceptual abilities, the way we look at the world. It has changed our behavior, and it even has the power to influence our beliefs and opinions!

The purpose of my talk is to explain and to expose the effects -- positive as well as negative -- of the photographic medium on the individual and on society.

I would like to stress that it is certainly not my intent to blame photography for the many ills that are plaguing almost every society, but I will try to show that it is the way humans use photography that produces photography's negative effects.

In order to explain photography's power, its popularity, etc., I need to tell you something about the way we perceive the world, why each of us sees it in a very personal manner. I need to tell you something about the difference between the verbal and the visual language and something about symbols.

It will help to clarify the role of the photograph in today's society, and its effects on all of us as citizens.

Allow me to return to my introductory statement on photography, where I listed some of the inherent blessings this invention had for mankind. As you will remember I emphasized photography's position in society, a position so powerful that society would not be able to carry on without it. What makes the photographic medium so powerful? In order to fully understand this power of the photographic medium, we need to analyze the medium itself and consider the impact it had on society at the time it was invented. We will start with the latter. Photography was the invention that enabled everybody to make pictures almost instantaneously.

It is quite difficult for us -- members of a consumers' world in which instant gratification on all levels is seen as the ideal life -- to really appreciate the significance of this ability to make a life-like copy of any object.

Prior to the invention of photography, it was only the painter who, after many years of apprenticeship, was able to produce a naturalistic likeness. This ability of the artist was considered not so much a skill than a magical gift, originating from God or the Devil, depending on the kind of pictures the artist produced. Now imagine the impact of this new technique. Photography placed this gift of making "life-like" imitations in the hands of everybody!

Seen in historical context, we can appreciate the excitement that this event created. It swept first across Europe and later across North America like wildfire. We have historical accounts of the long line-ups of people who wanted to be photographed. Today there is hardly any single household in our advanced society in which a camera cannot be found.

Photography is a mechanical reproduction process that requires the presence of the desired object. The photograph therefore is unlike any other visual image, a tract of the real thing. This double is not a rendering, an imitation or an interpretation of its subject like a painting or drawing is. Susan Sontag, in her book "On Photography"(1), compared this special bond between subject and photograph like something directly stenciled of the natural object, like a footprint or a fingerprint.

The specific characteristics of photography, its unprecedented naturalistic representation, and its authenticity were ultimately responsible for its popularity and society's dependency on it. This dependency on photography is better understood when we remind ourselves that in the previous century the Cartesian worldview prevailed.

The Cartesian concept stressed only the physical reality of everything. All of nature was considered to function like a mechanical system that could be taken apart like a machine. Knowledge was acquired by studying it piece by piece, through measuring, weighing, etc. Only photography could offer convincing proof of what was to be considered real in such a system. Conversely, what could not be photographed was not likely to be regarded as being real.

But it is not only these photographic characteristics that have contributed to photography's powerful influence. As we will see, there are other factors that gave photography its role in the shaping of today's world.

Modern cameras and photo materials enable us to make images instantaneously and without any effort -- a far cry from the early days of the medium, when it was extremely cumbersome for sitter and photographer alike. Especially the latter had to put up with many difficulties, technical as well as physical. Just remember that big heavy travel camera complete with tent, glassplates and chemicals! Not many of today's photo enthusiasts would put up with that kind of strain!

By reducing photography merely to an easier way of picture making, it becomes obvious that it is the visual image itself, rather than a specific technique that fascinates mankind. I am not implying that only modern man is captivated by imagery. There is much evidence that all the generations preceding us shared our appetite for images, be it to a much lesser degree. The art historian, Herbert Read, referred to man's fascination with pictures when he spoke about man as a symbol-making animal. Symbolism is defined as the art of thinking in images, a description that clearly indicates man's preoccupation with imagery.

To understand more fully man's need to express himself in pictures, it will be helpful to examine how we perceive the world visually. Many people still see the functions of our eyes as being very similar to the camera. Unfortunately, this view is inadequate. It leads to many misconceptions about the world and its reality.

When our eyes are open, we see all the things around us. When we shift our eyes the scenes will change. Most of us take for granted the fact that the objects we see are real and separate from us. But the eyes do not send pictures to the brain. The light entering the eyes triggers an electrochemical signal in the light sensitive cells located in the retina of the eye. These cells in turn send signals to a special area in the brain where they are processed. Thus the brain never receives pictures from the eye, but it *creates pictures*. To prove my point, let us now close our eyes. When we are not distracted by noise, images and thoughts come to us. In our mind we "see" the events of past experiences or imagine future ones. The process is referred to as visualization.

Many of us pay little attention to these inner activities even to the point of denying that the experiences are real. The external reality, that what we "see" with our eyes, is considered by most of us as the *essential* part of our existence while the inner reality, that what we see with our eyes closed, may be pleasant but rather irrelevant. Some of us perceive these mental images as threatening to our existence. We know a great deal about the external world, the world beyond our bodies, but we know precious little about our inner world. In a society with mass communication, we receive daily so much visual stimulation from the outer world that we have to make a conscious effort to become aware of our inner activities.

We have been conditioned to consider these two worlds as totally disconnected, but modern psychology finds it more and more difficult to maintain this distinction. A test, known as the Perky Effect, conducted by the American psychologists Segal and Nathan, shows that most of the people who participated in this experiment cannot differentiate between their inner and outer realities. Translated into terms of everyday perception, it means that what we see is dependent upon what we are and upon our interests at that moment.

For instance, as a photographer, I may look at fully grown trees and be fascinated by their beauty and majestic grandeur, while a lumberjack might see so many boardfeet of first-grade pinewood. The lumberjack and I have each created our own reality. Modern psychologists and physicists have accepted the fact that there is no fixed reality; they know that a perceived reality is inseparable from the mind of the observer!

I need to dwell a little longer on this paradox that exists in the relationship between inner and outer reality. As I have mentioned, most of us do not regard the inner world as very relevant in our daily routine. However, in the example of lumberjack and photographer, our inner reality -- that what we believe and think -- determines how we see the external world.

Modern science has thus acknowledged the validity of the concept of psychic reality that had previously been developed by the psychiatrist Carl Jung. Jung stated that all our sense impressions are psychic or mental images because these immediate experiences are the instant objects of our consciousness. His theory holds that certain psychic images are derived from a material environment to which our bodies also belong, while others which are no less real seem to come from a mental source which appears very different. Jung used the following example, and I quote:

> "If a fire burns me, I do not question the reality of the fire but when I have a fear that a ghost will appear, I will try to dispel my fear by thinking that it is only an il-

> lusion. But just as a fire is the psychic image of a physical process whose nature is unknown, so my fear of the ghost is a psychic image from a mental source; it is just as real as the fire, for my fear is as real as the pain caused by the fire."(2)

Many African and North American Indian cultures do acknowledge events of the inner world with equal or even greater importance than events of the outer world.

I have been talking for the last few minutes really about two ways of seeing: the "open-eye" perception -- the usual way of looking at the environment -- and the "closed-eye" perception -- often referred to as visualization, or seeing with the mind's eye. These two ways of seeing represent two basic mental activities: rational thinking and visual thinking. Rational thinking is expressed in the spoken and written language. Visual thinking is expressed in the language of images. The immeasurable variety of expression in the visual arts manifest that visual thinking is certainly not the lesser of these two thinking processes.

It is generally accepted that our minds can think only of one thing at a time. (The basis for this assumption is that conscious thought is focused attention.) We can prove this assumption valid by trying to concentrate on two things at once. We will soon discover that this is impossible! Therefore, attention always demands selection. Because of this we actually see or hear much more than we attend to, and we adjust ourselves with incredible efficiency to much that we never notice. As an example: just think how we all drive or walk through very complex patterns of traffic without giving it much conscious consideration. In the act of seeing, we select what we want to see and what to tune out. What we select to see becomes the figure; what we tune out becomes ground.

The establishing of the figure/ground relationship is the most essential operation in perception. We are doing it all the time. For example, when we look in a crowd for the face of a friend, we concentrate on a specific face; all others seem to disappear from our conscious awareness. The face is the figure, our focus; everything else becomes ground. The act of establishing a figure/ground relationship is selective and divisive. It encourages seeing differences rather than unities. This delineation of things seems to follow divisions and boundaries actually given in nature. Take as an example the body. It is divided from other things in the external world by the surface of the skin. But the point is that the skin divides the body from its environment in thought buy not in nature!! In nature the skin is an much a joiner as a divider; it is the link through which the inner organs have contact with light, heat, and air.

Similarly, we do not see the inseparability of figure and ground. But can we have ground without a figure? No. Figure and ground form an inseparable relationship!

It is precisely this breaking down in simpler unites, by labeling the external world, that man's trouble started. He lost his sense of wholeness with his natural world. This was a high price man paid for civilization.

Let me clarify this statement. Primal man lived his existence in unison with his environment. He felt that he was part of the physical and the spiritual world, part of the visible and the invisible. He interacted with, and saw spirits in every animal, tree, stone and cloud. This all changed when a more complex community life stimulated the development of language.

Mike and Nancy Samuels, in their book "Seeing with the Mind's Eye",(3) expand on this process by stating that words came to serve not only to evoke pictures or experiences but to separate man himself from the experience and externalize it! When words have no longer the power to evoke mental images, the language as a whole becomes too removed to trigger the sensations of the object to which they refer.

A similar process is taking place in the bizarre world of nuclear armaments. New words are being invented to disguise the horrid physical reality of nuclear war. I will give you some examples: megadeath -- the ability and efficiency of a bomb to kill thousands of people. The word "soft target" refers to cities which are "taken out" -- meaning they are destroyed. This new abstract terminology is referred to as "Nukespeak".

Thus our way of interacting with nature has become a matter of identifying objects in terms of labels and classifications. People are labeled either as leftists or rightwingers, as stupid, clever or crazy. Countries are developed, underdeveloped, or beyond help, etc., etc.

As a consequence, we experience the world in abstract terms. For our frame of mind, the truth about nature and the world lies then in the verbal explanation of them. However, we have to recognize that the fundamental realities of nature and our world are not, as our thought construes them, separate things. As we have seen in the figure/ground relationship, relations -- rather than things -- are the basic constituents of nature. I realize that this sounds rather abstract or even impossible, but when we scrutinize what we are perceiving, we will realize that relations are what we are actually feeling and sensing. Nothing more, nothing less; we know nothing more concrete.

For the sake of clarity, let us reflect upon the main points for a moment. Allow me to recapitulate what we have discussed so far about the perceptional process: conscious thought is focused attention. When the field of attention is too complex, concentration of our awareness is impossible. Therefore, attention requires selection. The mind, in order to make sense out of all the incoming information (sense impressions), constructs simple units, easy to comprehend. These simple units of attention, selected from our awareness, we call things, facts and events.

The verbal language developed by mankind was a sign/symbol system of simple units, necessarily used in a linear fashion. In the beginning words functioned to evoke particular images; they were concrete and powerful to recreate visual experiences. Later words came to function as labels and rational thought came to dominate. As a consequence, we have seen that man lost touch with his inner reality by distancing himself from his experiences and abstracting them.

Now let us look at the visual language and how it affected our perceptual processes. I mentioned already the existing misconception we have about seeing. The eyes do not act as cameras. The brain receives signals from the eyes via the optical nerves. Certain brain areas turn these signals into meaning, into symbols. This process is called "symbolic transformation". This basic symbolizing process is responsible for our mental imagery. Symbols can be regarded as the mechanism by which the brain makes meaning out of discrete pieces of information.

Carl Jung considered a picture symbolic when it had meaning beyond the grasp of reason. To give an example of such pictures, I can mention for instance the cross. Besides its meaning for Christians, the cross -- as one of the oldest symbols -- denotes the interaction of the physical and the spiritual world. The tree symbolizes the cycle of the universe. We speak of the Tree of Life, etc. Symbols by their nature can resolve paradoxes and create order from disorder. They provide, in flashes of insight, knowledge that joins scattered and different bits of information in a harmonious relationship (whole). Especially this aspect of the symbol is mentioned often by scientists like Einstein, Watson and Tesslar, who experienced these flashes of insight in their work.

My elaboration on the symbol is necessary for more than one reason. First of all, the visual language uses only symbols. Many of these symbols are of a universal nature. They differ from the accidental and arbitrary ones, in that they are concrete rather than abstract. It is believed that universal symbols are the translators of man's primal experience (Jung). We find them in myth, legends, religions, and works of art. The universal symbols are the most powerful ones. And that is the second reason for my reference to the symbol. The symbol, in its function, always influences people. When people become aware of a symbol as an image, they see, if only for a moment, the great scheme of things, the unity of the universe, and their place in it.

The visual language has, therefore, very different characteristics than the verbal language. It is non-linear and concrete. These two characteristics are the most important differences with the verbal language. Pictures are the products of visual thinking. This mode unites us with our experiences. Most pictures are created with feelings rather than with reason.

But the most important point is that the picture has retained the power that the word has practically lost. The picture reaches us within. This power of the picture to affect our emotions has been observed since ancient times. The Greek poet Horace said in his "Art of Poetry": "The mind is more slowly stirred by the ear than by the eye." Modern advertisers spend millions of dollars to expand their knowledge about the ways in which the visual image can affect us, whether we want it or not.

Pictures are thus unique in their effect on the individual. With the speed of light they are able to evoke stronger emotions in us than any other mode of communication. Our inner reality is mainly governed by two types of images. The primary image -- which, according to Jung, is a memory deposit, derived from a condensation of innumerable similar experiences of mankind. He called these stored images "the collective unconscious". The other type of picture in our mental imagery is the personal image, which has no collective significance, but expresses unconscious contents of a personal nature.

With this assortment of mental images, we may call it "our mental image bank", we produce in our mind our model of reality. This inner picture of the world is formed -- in a way we do not comprehend -- out of stimuli we receive from our environment. These personal viewpoints are creating very different value systems which become conditioning factors for the individual. The term 'conditioning factor' gets a more sinister or Orwellian ring to it when we learn that every society depends for its existence on a certain viewpoint in the minds of its members. This viewpoint, also called a mindset, is a system of shared beliefs and opinions; an ideology. Such a mindset regulates the behavior of the individual in conformity with the needs of society. In the individual, the beliefs in question are not innate but are the result of the conditioning forces of society.

The specific characteristics of the visual language made the picture an important tool in conditioning the individual for his conforming role in society.

Pictures have always been used to represent the appearances of something that was absent -- be it the images assumingly representing the animal spirits of Cro Magnon Man or the religious icons of the Middle Ages representing the Creator of our world, or the mass media photographs of the celebrities of our time. All these images had their intended effect on the viewer.

The photographic image is particularly well suited to be used as a conditioning force in political and ideological propaganda. Its authenticity, its graphical richness, and its immediacy strengthen the concreteness of the photograph which, as we have discussed, gives the picture its power of arousal. The repeatability of the photograph makes it economically very attractive to the manipulative powers of the mass media.

I hope to have clarified why photography has the power to influence the individual by modifying his perception. Let us now examine why photography lends itself exceptionally well to promote the ideology of society.

The development of the halftone process caused a technical and iconic revolution. It introduced the mass media photograph that became the focus of daily newspapers. It illustrated sports, advertisements, boulevard journalism, etc. Natural and man-made catastrophes, revolutions, murders -- all these events became a private subjective spectacle for the individual reader, manipulated by newspaper owners. The printed media, as well as the electronic media, use the authenticity and objectivity of the photograph to make their presentation of the world credible.

It was Life magazine who brought the advertising image to its present-day prominence. Robert Pelfrey describes these Life magazine pictures as follows: "In the gloom of the Depression, these images of smiling men and women along with the technical marvels, added up to a spectacle as meaningful as that of the ceiling of a Baroque church, with its vision of heaven and its revelation of glory-bound heroes, angels and oceans of light."(4)

Life's advertising pictures belonged to a class of pictures that represented America's ideology: that of consumer capitalism. The advertising industry has acknowledged the power of the visual image over the individual. In North America alone its annual budget is over 50 billion dollars.

It is more than interesting in the context of this information to recall a major address given by one of America's presidents, Calvin Coolidge in 1926. It will open the eyes of any skeptic who has difficulty in believing the use of imagery in service of the ideology of a society. In this address, President Coolidge acknowledged the basic function of advertising as education. He referred to the pages of advertising in the press and magazines and the billboards along the highways as enormous vehicles of advertising art. Then he continued, and I quote literally: "I doubt if we realize at all the impressive part that these displays are coming more and more to play in modern life. ... We see that it basically is that of education. It makes new thought, new desires, new actions. ... Rightfully applied, it is the method by which desire is created for better things."(5)

Listen to what the President had to say about desires created by these advertising images. "The uncivilized make little progress because they have few desires. The citizens of our country are stimulated to new wants in all directions. In order to satisfy their constantly increasing desires, they necessarily expand their productive powers. They create new wealth because it is only by that method they can satisfy their wants. It is this constantly enlarging circle that represents the increasing circle of civilization."(6) Did President Coolidge not realize that society's unchecked desires would easily turn it into a society of greed?

This statement is one of the strongest endorsements that advertising pictures are serving the ideology of a society.

Looking at today's advertisements, we know that its ideological function has not changed at all. The pictures in advertising have become icons that uphold the myth of the autonomous individual who identifies freedom with the freedom of choice in consumption.

The importance of imagery in the business of manipulating our beliefs and behavior is underlined by the use of pictures in the political arena. Ronald Reagan alone spent $158 million in his campaign for the presidency in 1980,(7) a clear testimony to the effectiveness of the modern techniques of persuasion. The facial portrait has displaced the issues; mannerism and pose have replaced substance.

The mass media does not create images as much as it expands or magnifies them. It is through this manipulation that pictures become icons. Their function as icons in the mass media is to shape and reflect the culture's basic values.

It is not only the mass media that use pictures. Nearly all major corporations and institutions use public relation firms to promote carefully-crafted images of themselves. These 'PR messages' are designed not to sell specific products, but to create a climate of respect for the trans-national corporations and their achievements.

I do not have to elaborate on the prominence of the role of the photographic medium in all these activities. We are all too familiar with the proliferation of pictures in the daily newspapers, magazines and on the television screen. We all have personally experienced the persuasive power of the advertising image. Its influence becomes very obvious when you have to provide parental guidance in all the facets of living to young adolescents.

I will finish my discourse on the photographic image with a few remarks about the responsibility of the imagemaker and that of the image user.

From our discussion of the perceptual process we learned that our perceived world is composed of images of the primary and of the personal kind. Our interpretation of the external world is determined by the mindset that is formed by the culture in which we grow up. As a consequence, we learned to interpret the world according to the accepted view of our parents and the social group they belong to. This viewpoint is most likely in alignment with the ideology of the cultural environment in which they function. Thus, the acquired mindset not only limits our perception of the world but also limits our interpretation of pictures. This should not surprise us since we have learned that our inner reality structures our external reality. Freely translated it means that we can see only that what we believe!

We cannot understand a picture when we do not have the knowledge of how to interpret it. Understanding always presupposes a process of cultural training or habituation. Pictures have meaning only when there is a system of reference available that provides us with the basic material for interpretation.

This is precisely the task of the ideology of a society -- to provide its members with a programmed stock of images, an imagebank of icons reflecting the basic values of the culture!!

The purpose of advertising is therefore not only to stimulate consumption but also to provide a system of meaning. As an example, I can cite the well-known Marlboro cigarette advertisement. The Marlboro man is not just a cowboy, he is an icon of American independence and self reliance, recognized around the world. Such mass-produced pictures as Mickey Mouse, Rocky, Rambo and the Marlboro cowboy combine a sense of innocence, power and individualism that seem to have a universal appeal.

I come now to a key question: Who performs the transformation from an ordinary image into an icon? It is, in addressing this crucial point that I refer to the title of my talk

-- I confess somewhat belated -- The Photograph: an Icon of Violence or Peace? I say a crucial point because the transformation of a picture from an ordinary one into an icon provides the image with iconic power.

Most of us would probably hold the imagemaker as being solely responsible for this manipulation of the picture. But by doing so, we would overlook a critical aspect of any form of communication -- that of the beholder's share. The knowledge and imagination of the beholder makes him an active participant. Without these two ingredients there is no exchange of meaning possible. I will explain this. The meaning of an image is not in its likeness to the object but in our knowledge of the object. I should mention here that we need to differentiate between knowledge of an object gained by just looking at it and the acquaintance with an object by not only looking at it but also by experiencing it with our other senses, especially the sense of touch. Pictures can never catch the quality of an object . As beholders of images, as spectators, we need to supply our knowledge and imagination to the picture in order to give it the intended meaning. In doing so, we become collaborators in the making or, should I say, the recreation of images, even of the ones we profess to dislike or abhor because of their violent content.

As imagemakers and image beholders, we are all responsible in the productions of icons that reflect the true values of our society.

I feel compelled here to emphasize an important point. Imagemakers should not use this collaboration of the public as an opportunity to disregard their responsibility. It is very tempting indeed to absolve one-self by saying, "Well, the public wants this kind of picture." It becomes apparent in the light of all my information that the imagemaker has indeed a great or even a greater responsibility in the creation of pictures than the beholder. To explain the photographer's responsibility, it is helpful to know that there are always two different skills involved in the making of pictures. The first one is the technical knowhow to make a technically good photograph. The second skill concerns the creation of the intended meaning of the picture. It is in the creation of the message that the photographer takes his stand. At this point he has to decide if his picture will be harmful or appeasing to humanity. Socrates' simple advice of "know thyself" may be very appropriate for the modern photographer.

Why do we see so much violence in pictures? Is it because we have accepted beliefs and values that encourage the use of violence? Is it because society's ideology is promoting violence? May I remind you of President Coolidge's speech. Our civilization is based on unchecked desires. Competitiveness is considered as healthy, but it incorporates a continuous struggle for dominance and an endless desire for more. Can we not say the same about the nature of advertising? The heavy-handed use of women depicted as sex objects will not create the belief that woman is man's equal. Or what about the beauty ads which promise eternal youth? Or the diamond and gold ads which turn love into a commodity? All these icons reflect the current values of our society.

That these norms brutalize and degrade the female personality, exploit and enslave people is clear. These accepted norms condemn whole nations because of their different ideologies. These norms allow murder, rape and torture because the victims hold different values than those of their oppressors!

We are what we think and we see what we believe. The images we make and use reveal our mindsets. If we want to make the photograph an icon of peace, we need to look not at the differences between man and woman, between races and nationalities, between humankind and nature, but rather we have to look at the similarities that unite us all. We should stop looking at the world in 'snapshot'vision, and learn to see the relationships that provide meaning to everything in the universe. This unconditioned, unprogrammed way of seeing will enable us to see the external world not in the accustomed rational order. Instead we will perceive it in a sense of wonder that will resonate in harmony with our inner world.

Yes, photography can become an icon of peace if we allow our limited, conditioned vision to become a vision without borders!

References

1. Sontag, S. (1073) On Photography, Farrar, Straus, Giroux, New York, N.Y.
2. Jung, C. (1933) Modern Man in Search of a Soul.
3. Samuels, M. and N. (1975) Seeing with the Mind's Eye, Random House Inc., New york.
4. Pelfrey, R. (1985) Art and the Mass Media, Harper and Row, New York.
5. Presby, F. (1961) History & Development of Advertising, Greenwood Press.
6. Ibid
7. Swift, R. (1985) New Internationalist No. 146, April 1985. "Everything under Control".

Architectural Photographs Promote Student Awareness and Aesthetic Appreciation

Joyce Phillips

Becoming visually literate enhances the development of the whole learner and creates a more informed individual in an enlightened society. An educational program that provides the opportunities for students to develop the active process of visual awareness strengthens yet another dimension in the education of the individual.

Oklahoma City Public Schools, consistently recognizing the merit of community involvement in education, has actively supported projects sponsored by the American Institute of Architects, Central Oklahoma Chapter. Last fall, the AIA announcement of a photography competition entitled "Focus on Architecture" received school district support through sponsorship of a student category. The student category (grades 6-12) was included as a creative way to encourage students to become more aware of their architectural environment through the visual art of photography. The younger students who participated were enrolled in the gifted and talented middle school program of Oklahoma City Public Schools.

In order to prepare these students adequately for this experience, photographer-architect-teacher teams were formed. The photographer presented a class lesson on principles involved in quality picture-taking and returned to show students how to operate a 35mm camera. Students learned that in order to capture artistic perspective and intent, they must understand, identify, and emotionalize with the architect. They should "feel what the architect feels" and "see what the architect sees." As photographers, they would blend the art of vision and perception and would accept responsibility for enhancing architectural intent through utilizing the two dimensional medium of photography (AIA). To convey the emotional response intended by the architect, students must focus on capturing the message of "the whole" with a camera.

The architect observed the presentation of the photographer and then presented two class lessons emphasizing basic concepts that students needed in their own backgrounds in order to experience meaningful observations within the community. Students realized that architecture appreciation means learning how to perceive (AIA) and that design is a process of purposeful visual creation (AIA). Through studying specific architectural elements, students concentrated on developing architectural and design awareness. Slides of familiar places in Oklahoma emphasized specific concepts during these class presentations.

My role as classroom teacher provided the opportunity to integrate "Focus on Architecture" with the differentiated curriculum offered to gifted and talented students in Oklahoma City Public Schools. To meet the diversified cognitive, emotional, and social needs of gifted and talented students, the Autonomous Learner Model for the Gifted and Talented, developed by George Betts and Jolene Knapp, is included in the developmental curriculum. As the needs of the gifted are being met, students develop into autonomous learners with abilities to be responsible for the development, implementation, and evaluation of their own learning (Betts). Because students need opportunities to explore content which is not usually part of the everyday curriculum, they found the explorations into photography and architecture to be exciting and challenging. Classroom activities were designed to augment the concepts presented by the photographer-architect teams, to enhance development of creative thinking strategies, and to stimulate students' learning capacities.

Students organized and participated in observation sessions during weekends. During the first observation, students were to visit various architectural structures, to satisfy curiosity, and to increase awareness of what was actually around them. For the second and third observations students were to revisit the selected structures at different times of day to observe the effects of light, to practice framing techniques, and to employ the checklist created during class sessions. Students were to think, plan, and observe; then they were ready for cameras.

Three weeks after beginning this project, the exposed film was due. Because students had, during that time, immersed themselves in observing, thinking, and expressing, they continued to bubble with unabated enthusiasm about things that they were "seeing" for the first time. These revelations and new enlightenments focused on their everyday environments. It was as though they had suddenly become aware of the visual impact of their surroundings.

Within a few days, contact sheets were returned for preview. Students were absolutely delighted with the results. Through these photographs they had concrete proof to communicate the degree of visual awareness that had developed. The architects met individually with students to evaluate the architectural concepts portrayed in each photograph. Although narrowing to one final choice was sometimes difficult, each student selected one photograph to be produced in 8x10 format. Mounted pictures received many positive reactions from students and parents, as well as accolades from the professional staff that had been involved.

The architects juried and identified significant school level entries. Students then submitted their photographs to the AIA "Focus on Architecture" competition.

Students waited eagerly for the announcement of winners. It was with unselfish joy in each other's success that these sixth graders celebrated the announcement that the Gold and Silver Medal winners were chosen from our entries. They had competed successfully with more than 250 entrants in grades 6-12.

These winners were guests of honor at the Ninth Annual Honor Awards Ceremony at the Kirkpatrick Center in Oklahoma City. All student entries were then exhibited at the International Photography Hall of Fame and Museum. The winning photographs were also recognized through a special feature in the Oklahoma Architecture 1987 Annual Directory.

During two months of interaction in "Focus on Architecture", my involvement expanded to encompass additional responsibilities. Taking initiative for coordination of professional efforts, implementation of educational strategies, and mobilization of support systems made this experience meaningful and successful for the students. Initially, it was important to become aware of all resources available for this program, to establish rapport with professionals, and to determine the most effective way to utilize expertise and talents.

In the classroom setting, it was critical to evaluate the previous experiences of students, to concentrate attention on the identified objectives, and to help students create a mind schema or framework to set the foundation for concept development. Teaching techniques in problem solving and presenting opportunities for practice encouraged students to resolve their problems. Allowing ample time for assimilation of concepts helped students to develop meanings for new concepts presented by the architects and photographers.

The employment of successful communication techniques required involvement of parents, school personnel, as well as professional architects and photographers. Parents were needed to spend time with their children on two or three observations outside the school setting. Through these observations, students experienced the opportunities to verbalize and demonstrate to their parents the transfer of classroom concepts to actual practice. Including parents in the observations also increased and reinforced their own awareness. For the professional resource people, these class interactions were initial experiences with groups of young adolescents. They sought input on the most beneficial instructional approaches to maximize the time spent in each presentation. The involvement of school personnel was critical for technical assistance in supplying film and cameras, in processing contact sheets, and in preparing enlargements.

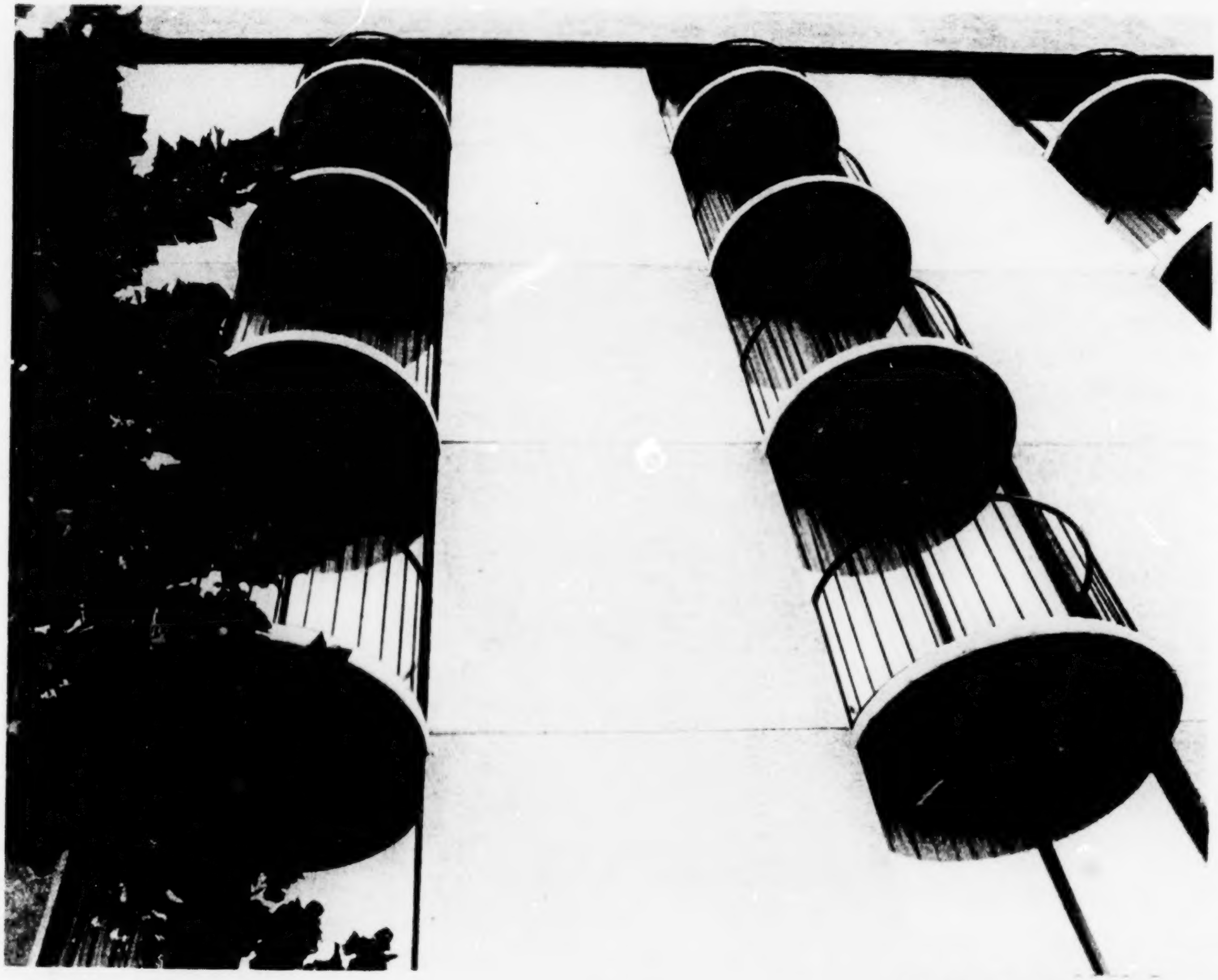
The diversity of visual impressions evident at the end of this project was the direct result of a synthesis of students plus background of experiences interacting with the environment to create specific individual reactions. The interaction of students, experiences, and concepts resulted in personal interpretations revealed through the eye of the camera. Their finished products reflected the degree of visual impact and the assimilation of concepts. The experiences in this competition provided the foundation on which these students will continue to mature as visually literate members of society.

REFERENCES

American Institute of Architects, Focus on Architecture Resource Handbook, Oklahoma City: American Institute of Architects, 1986.

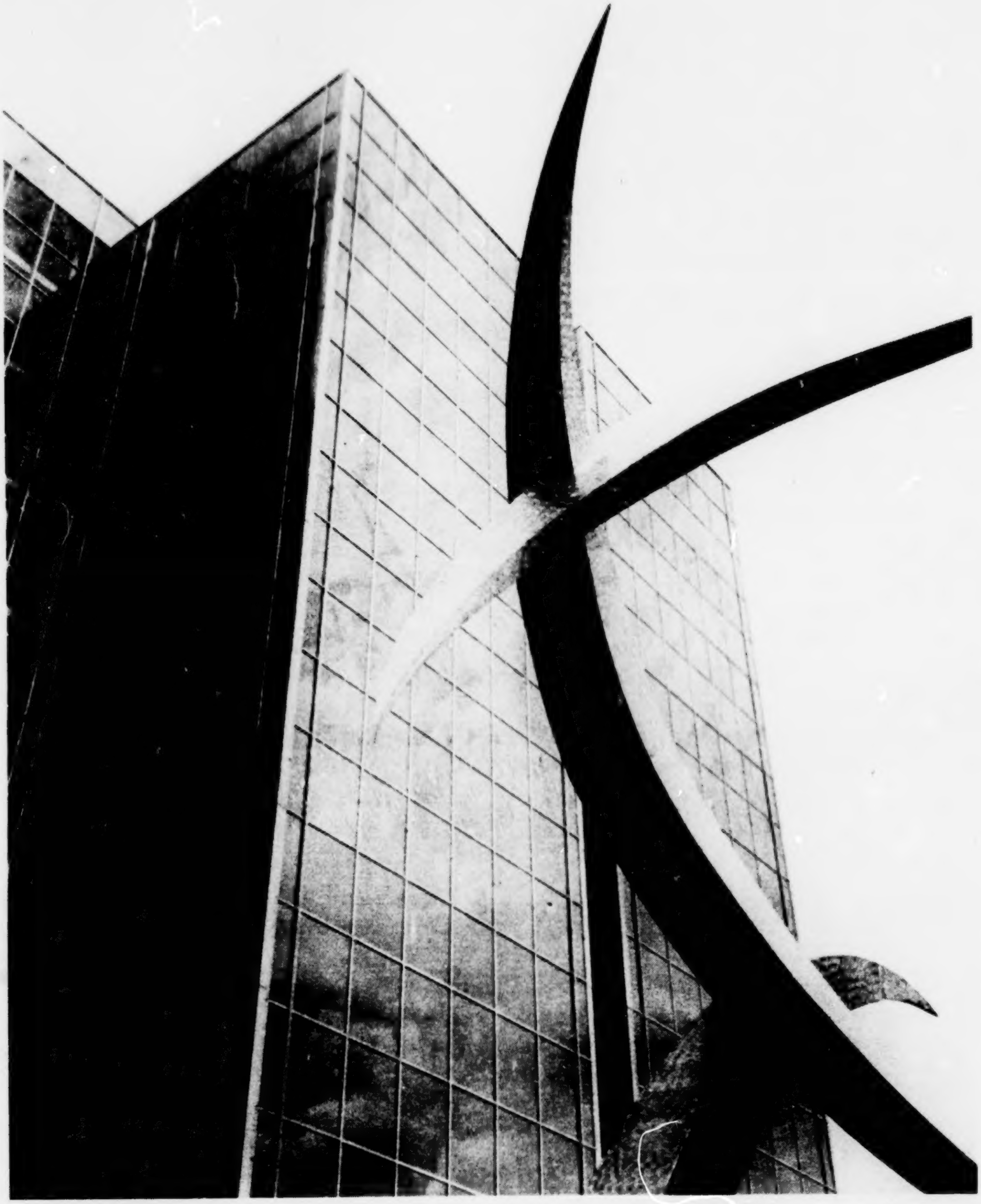
Betts, George T., Autonomous Learner Model for the Gifted and Talented, Greeley, Colorado: Autonomous Learning Publications and Specialists, 1985.

BEST COPY AVAILABLE



Mary Finnigan
Hoover School 6th Grade

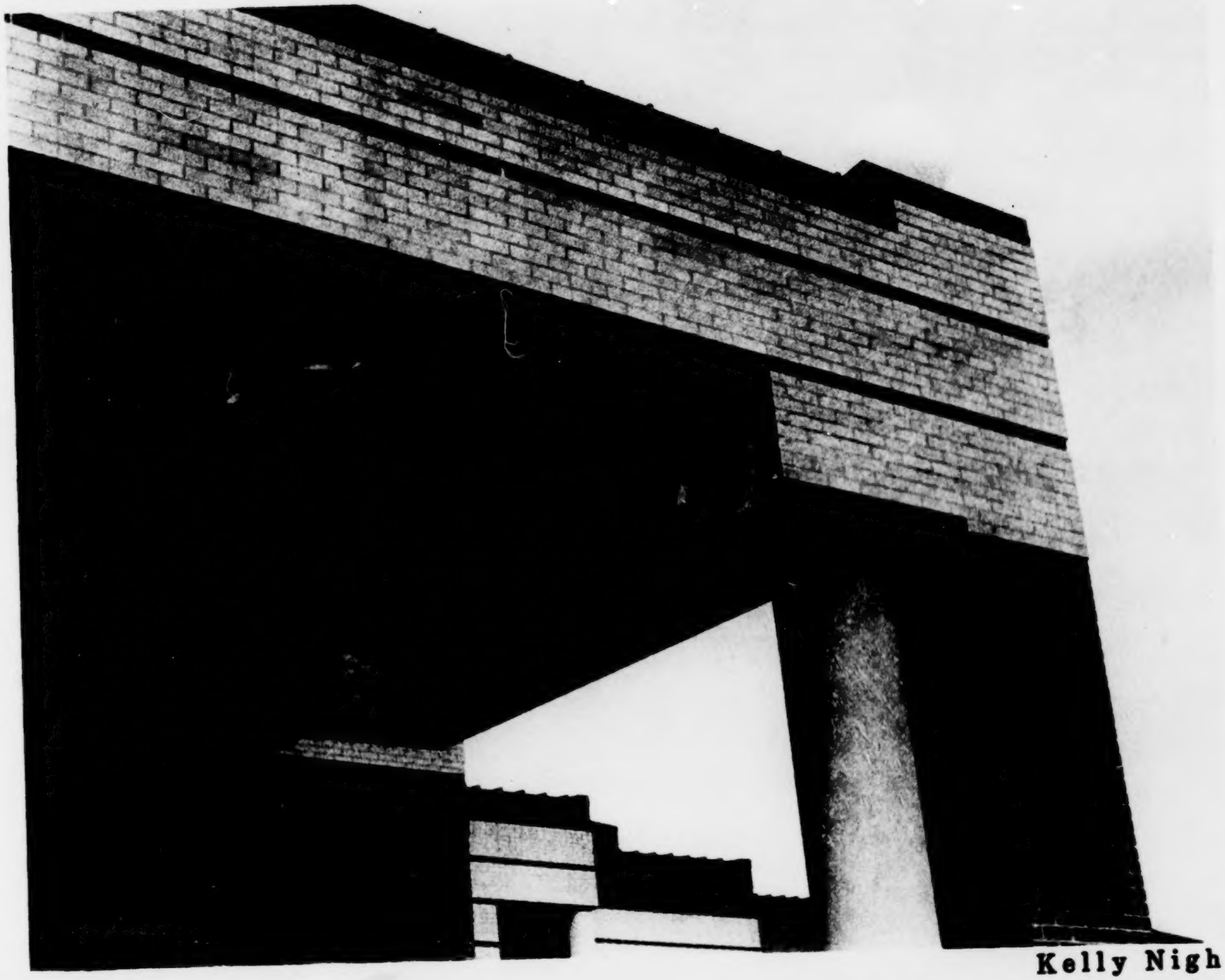
BEST COPY AVAILABLE



Shauna Jones

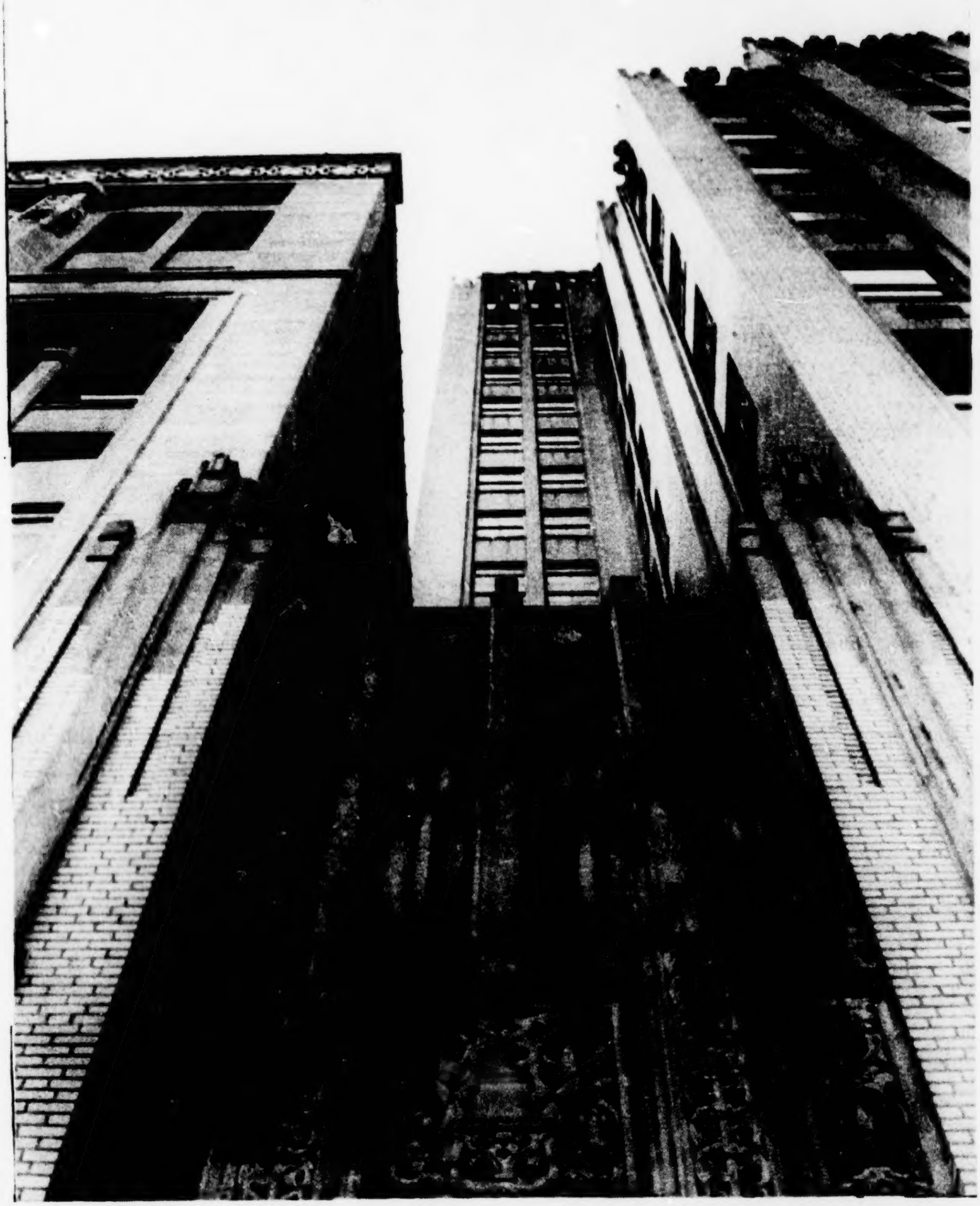
Hoover School 6th Grade

[illegible]



Kelly Nigh
Hoover School 6th Grade

BEST COPY AVAILABLE

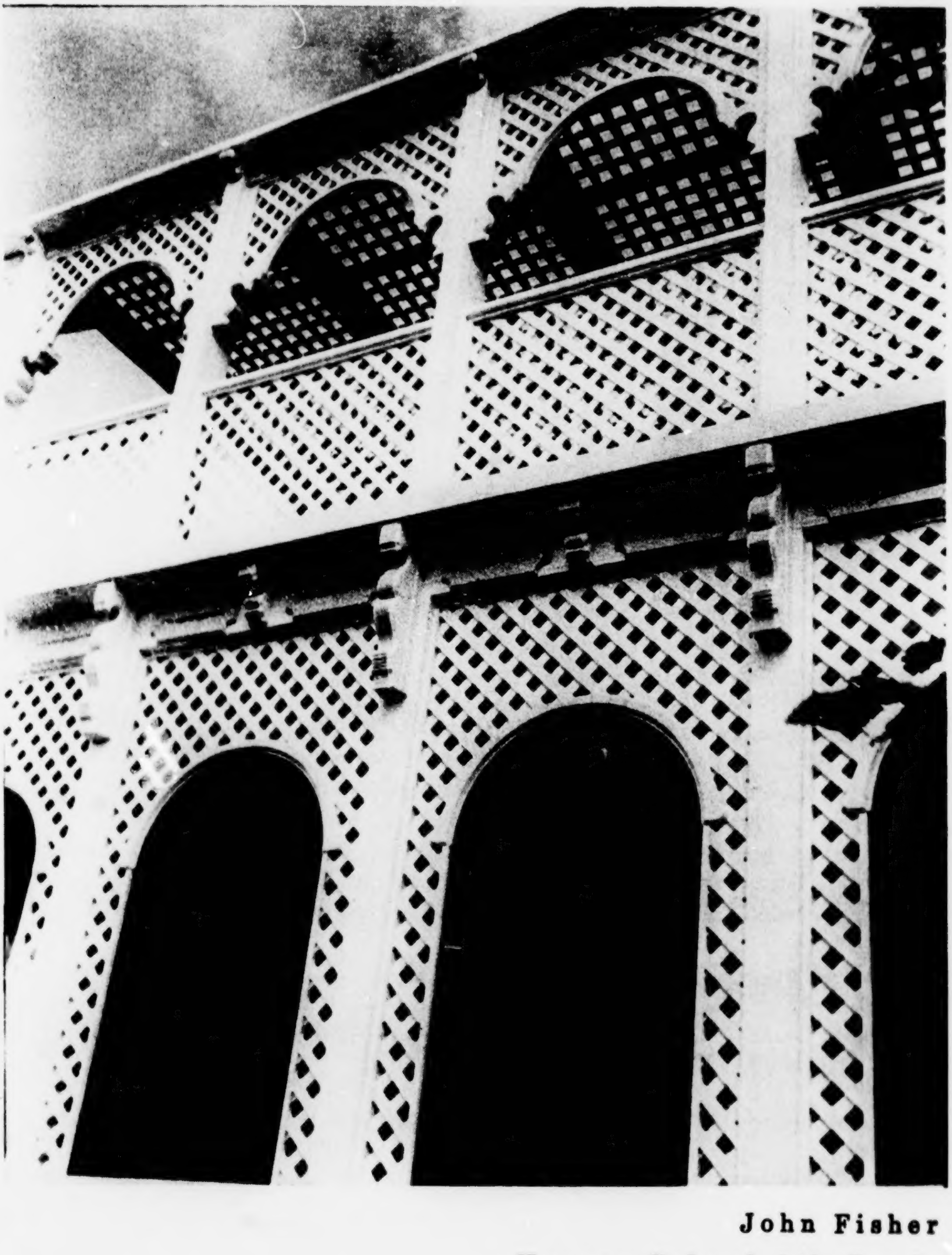


Kelly Hargesheimer

Hoover School 6th Grade

404

BEST COPY AVAILABLE



John Fisher
Hoover School 6th Grade

BEST COPY AVAILABLE

Holly Taylor
Hoover School 6th Grade

BEST COPY AVAILABLE

Turkey: Conflicting Values, Contrasting Images

Marina Stock McIsaac

Turkey is a country of contrasts. Its geography is both rugged and gentle. Its temperatures range from hot and humid along the tropical Southern Coast where bananas and palm trees grow side by side, to cold and dry along the alpine glaciers atop Eastern Mount Ararat. It is also a land of conflicting values; conflicts between old and new, traditional and modern. No description of modern Turkey could be complete without a discussion of the man who struggled to rescue Turkey from the decay of the Ottoman Empire and who fought to create a Republic.

Although Ataturk died in 1938 he is still revered as the national hero. The principles and values of this great leader continued to direct daily life, however conflicting values continued to cause problems between traditionals and moderns in politics, religion and social life. From the simple observation that many Turks drink alcohol in the form of beer and Raki, to the more subtle observation regarding their lenient attitude toward religious practices, it is evident that Turkey is not an Arab country but a unique mixture of East and West, of traditional and modern. Nowhere is this more evident than in the visual experiences which greet the visitor to this fascinating country.

Turkey has the unique geographic position of straddling two continents. With one foot resting in Europe (Istanbul and Thrace) and the other firmly planted in Asia (Anatolia), modern Turkey is in a good position to learn from the successes and failures of its neighbors. Since 1923, when Ataturk founded the Turkish Republic, Turkey has used the European model for its economic, political and educational development while maintaining its cultural ties with the East. Many Turkish art forms; shadow theater, music, dance and literature have their roots in Asia. Similar to its Asian neighbors, Turkey, with a large population of over 50 million people, is a developing country. It continues to be plagued by high levels of unemployment and low levels of education.

As in many Western countries, opportunities for women have been affected by their family duties, their role in childbearing and raising children, and their legal status. The role of women is established by tradition, peer and family pressures and legislation which frequently gives advantages to the male sex. In addition, Turkish culture encourages women to take a passive role. In spite of these constraints, women in Turkey have benefitted from attitudes and legislation formulated during Ataturk's modernization movement. As a result, Turkish women did not have to struggle for their rights as actively as did their counterparts in many Western countries.

After the establishment of the Republic in 1923, women were helped tremendously by the reforms introduced by Ataturk, considered by most to be the father of Modern Turkey. The principles of Ataturk relied heavily on equal rights for men and women. Many of his speeches reflected his thoughts that the modernization of Turkey would be impossible to accomplish unless women were recognized to be among Turkey's greatest resources. In his speech in Kastamonu in 1925, Ataturk stated:

> "Is it possible that one half of the nation can be developed and the other half neglected if we are to have a truly developed country? Is it possible that one half of the nation can be uplifted while the other half remains rooted to the ground?" (Ataturk, 1925).

As a result of the reforms of Ataturk, rights which women in other countries struggled with for centuries, were granted to Turkish women in a short space of time. Turkey became the first Moslem nation to promote feminist issues at the national level. Both Ataturk's attitudes and his speeches were repeatedly referred to by other Moslem nations undergoing modernization. Under his leadership the veil was outlawed, Islamic law based on the religious and civil supremacy of the Sultan was abolished, and the civil code of Switzerland was adopted. In 1930 women were given the right to vote. Ataturk believed that scientifically based education was needed to eliminate class distinctions and to equalize opportunities for men and women. However, although Ataturk tried to improve the roles of women in society and erase class distinctions, other reforms were slower in being realized.

Religious and economic reforms are among those which continue to cause conflict. These conflicts are visible as modern and traditional, rich and poor, peasant and business executive, primitive and ultra-modern, exist side-by-side. Images bombard the visitor. From the Istanbul covered bazaar with its over 4,000 shops, to lonely shepherds high on the Eastern steppes of Anatolia, the rich colors, decorative costumes, and welcoming smiles communicate the warmth of this country to the visitor.

The goal of this slide presentation is to convey visually to the stranger some of the conflicting values apparent in modern Turkey and to present images of those contrasts in family life, religion, work and leisure. The richness of images in a developing country such as Turkey where the old and the new exist side-by-side offer ample rewards to those who take the time to look.

Ethical Consideration in Visual Literacy

Val E. Limburg

There's the good ol' adage: "Photo don't lie." But, then, they don't always tell the whole truth. Truth, as most of us realize, can be cropped along with the unimportant or non-symmetrical part of the visual.

The premise of this paper is that an understanding of how the visual can distort should be considered part of being "visually literate."

Any examination of the visual media reveals that distortion can and often does occur, especially if there is a point to be made supporting a particular view of the world. Examples might include political cartoons, deliberate lens distortion, cropping, and nonrealistic perspectives such as microphotography and high speed photography.

We can distort, we can manipulate with visuals. And, legally, there may not be much that can be done. On occasion, there may be those subjects of photographs who feel that their identity has been distorted to the point that they have been defamed, or their privacy has been invaded. The courts are full of such examples.

And yet, the legal concept of "invasdion of privacy" is a slippery one. It has been bound up with journalistic snooping that usually has exceeded the boundaries of propriety. Although privacy has come to be regarded as a personal right, along with life, liberty and property, it wasn't until the late Nineteenth Century that the basic concept of privacy was argued to be a concept in American law. Samuel D. Warren, a prominent socialite annoyed with a prying press, and Louis D. Brandeis, a Harvard Law School classmate wrote of the "Right of Privacy" in Harvard Law Review (Brandeis and Warren). Although their writings did not result in legislation to protect citizens' privacy, there were lasting impressions and presumptions for civil protection which came to be recognized primarily in case law. Thus, while "rights of privacy" are not always laws, they may be recognized as such in some legal jurisdictions or states.

Perhaps a more important consideration in the notion of visual impropriety related to rights of privacy is that of ethical consideration.

Everything that is visually accessible legally may not wish to be seen by potential viewers for reasons of discretion, taste, or other value-oriented norms. Perhaps the best way to explain this is by using the role of photographer for a newspaper or magazine, or of a videographer for a television news organization.

One legal and ethical consideration is whether the photographer intrudes upon someone's privacy when taking the pictures. Case law dictates that if the incident takes place within public purview, it may be published without illegal intrusion, no matter how private or personal the incident.

Files are full of photographs which, although the subjects often protested, were legally published or broadcast.

This is true, whether the pictures were of disasters, insane behavior of criminals, police reaction to crime, the violence of war, or escape from violence.

In one newspaper photograph, family members are huddled over the body of a young boy. Grief is evident. All the more compelling is the fact that the older son, who had been given the responsibility over his brother while swimming, learns of the boy's drowning just at the moment the photo is taken. Is the photo of this family's most personal moment an intrusion on their privacy? Does it make a compelling visual statement? Should it be published? What are the ethics involved? These are questions related to visual literacy in media news coverage.

In this situation, the photo was cropped to omit the body in its body bag, then published. Public reactions to running the photo were in loud protest. And why is that? Does some photo editor somewhere not understand the impact of such visualization of moments of strong emotion? Is a gatekeeper of the flow of media icons visually illiterate?

No, it's not quite that simple, of course. The answer, it seems to me, is that while such media senders may not be entirely visually literate, there are some ethical guidelines which may be an integral part of his or her professional value systems. The Society of Professional Journalists, SPJ, also known as Sigma Delta Chi, has articulated its Code of Ethics. It incorporates the notions of serving the public interest openly, while also avowing that "the news media must guard against invading a perons's right of privacy." (SPJ/SDX Code of Ethics)

Often, these two ideals conflict. From time to time the conflict is apparent and warrants an explanation by some media professional. An ad run recently by KnightRidder Newspapers shows the scene of what it terms a "grisly picture," a victim of a volcanic disaster in Colombia. The picture carried the cut line, "Why do they have to show things like this in the newspaper?" About four hundred words of explanation go on to explain the necessity of communicating with such symbols. (Knight-Ridder)

Such seemingly contradictory ideal points out the necessity of placing legal and ethical considerations in the study of visual literacy, at least as it is associated with media visuality. It thus becomes the task of the editor or news administrator to place such visualization into suitable legal and ethical contexts.

This can be further explained in a recent visual news event that took place in Pennsylvania when a local political figure who had been charged with fraud held a press conference. Many reporters present assumed that the politician, R. Budd Dwyer, would announce his resignation. After some rambling, he noted that some of the television photographers were starting to take down their cameras. He warned them not to take their cameras away yet. He put his hand into a brown manila envelope and pulled out a pistol. Cries of alarm only prompted him to wave the pistol and warn people not to approach him. Dwyer then brought the pistol in front of his face, put the barrel into his mouth, and then pulled the trigger. A gory scene unfolded. The really telling incident of this story is the behavior of the photographers. Even after Dwyer had slumped to the floor against the wall, some photographers continued to take pictures. Associated Press photographer Paul Vathis said, "From professional habit, I just kept taking pictures." (Buell)

From the producer's point of view, the whole gamut of photographs were there and available for use. A check by the AP Bureau in New York showed almost every newspaper published a picture to accompany the story about the incident. We are, after all, a visual culture, and were compelled to the story mostly for its visual componants. Most papers printed the picture of Dwyer waving the gun; some printed Dwyer with the gun in his mouth. A few even printed Dwyer slumped behind the desk after he shot himself. Some used the entire sequence of shots. Many editors reported that readers protested the photos showing Dwyer with the gun in his mouth. No one is reported to have objected to either the written description or the photos of Dwyer simply waving the gun. Somewhere here, there's a line of discretion, at least in the mind of some readers. The Associated Press Managing Editors and the American Society of Newspaper Editors are surveying newspaper editors in an effort to discover just what went into the decision-making process in running the pictures.

Even more interesting is the coverage of this event by television recorders. Obviously, the line of action was more continuous. But where was the line of demarcation to be drawn, if at all, for this very visual story? The networks carried the story, not because of its news value on a national scale; the story was likely only regional in scope. Yet its visual nature put it on the national networks. We heard the story explained; we saw Dwyer wave the gun and warn others to stay away. Then a curious thing happened, made possible by state-of-the-art technology in television. Visually, the frame froze on Dwyer waving the gun.
But the audio continued: we hear cries, "Oh my God, don't do it!" Then we hear the shot, followed by cries and screams. The narrator tells us what happened and we hear what happened, but we are not privy to see the visual of what happened. Why not? Someone, somewhere in the gatekeeping process understands through some system of visual literacy, that the

visual componants of this story are probably too powerful for normal public consumption. One must wonder, however, what are the elements of "literacy" that comprised the understanding of the visual elements here? And are they understood with any kind of universality?

This is partly answered by the fact that some Pennsylvania stations did, in fact, carry the entire visual episode --- with the predictable results: storms of protest from viewers. (Buell) In some sense, then, we understand that the lines that are drawn by gatekeepers are partly determined by the reaction of the viewers. We may also understand from this case study that the standards of "opportunity" (the role of the photographer) and the standards of the content overseer (the editor) may differ. The answerabililty is different. The level of "literacy," if you will, varies, depending on the role in the visual communication process. Such a role of the media professional causes him or her to see visual images differently. A photo editor, for example, may be less offended and more compelled to publish than a reader/viewer who feels that the media are not sensitive to personal tragedy. The media, consumers suggest, are driven by the profit motive to exhibit the bizarre and the shocking. The ethics are thus different; the "literacy" concerning the meaning of visual icons works at different levels. And this is so regardeless of the education, culture, or socioeconomic background of either.

These lines have been exhibited in many ways at various times.

Early in the Viet Nam war, Western cameramen were present when a self-styled execution of a Viet Cong suspect took place. The direct point-blank shot to the head was not a sight most people would embrace. One famous picture of the episode captured the moment just before this line of discretion would occur. Also present, however, was an NBC cameraman who capture on film not just the execution, but visual of the head, partly blown away, with blood and brains flowing out onto the street. The TV network editors determined not to show anything after the shot was fired and only described it in verbal form. Subsequent photos of the ugliest part of the scene was used not long afterwards in an attempt to communicate strong anti-war messages to the public. Such visuals seems to work in evoking a strong negative emotional response.

THE MULTI-LEVEL STRATA OF VISUAL LITERACY

Viewers understood they had a strong emotional reaction in both of these instances, yet rarely did observers sit back and impassionately ask themselves why. There seemed to be little attempt to learn the emotional elements associated with visual literacy.

Perhaps the reason is that such emotional reaction are value-based, and values differ considerably from country to country, culture to culture, and even subculture to subculture.

My premise is simply this: we cannot consider ourselves fully literate visually unless we have an understanding of the ethical boundaries constraining the use of visuals.

Whether we are considering images of nudity, or of human disfigurement or of frightening tragedy, there must be a knowledge of how the value system of the beholder will regard those icons.

(My own notion is to illustrate each of my ideas along the way in this paper, and to interject pictures of nudes, disfigured victims, and frightening scenes of horror. Yet, I feel that there were values more important than aptly illustrating each of my points. The respect of those to whom I am addressing my remarks must be considered to have a higher priority.)

The differences here are of consent, of admitting and allowing certain kinds of visual material to be accessible to one's senses. In most instances we can anticipate what kinds of material are available in which media under what circumstances. But there are times such anticipation is not possible. It is on these occassions that one must consider the notion of "intrusion" into some kind of norm of privacy, some value where the potential perceiver might find offense in the nature of the material. One might well consider the premise that in a highly diverse culture, with greatly differing value systems, it may be important that visual communication gatekeepers become visually and morally aware, if not literate.

MEDIA CODES: HOW FORMULATED?

There are codes of ethics recommended for the media gatekeepers who pass on to us the images of a diverse society with a whole huge range of values. We may disagree with such ethical guidelines. After all, isn't it just someone else with his or her own value system formulating such codes? And so, what provisions are there to react to these value systems of others, whether codified or individualized?

What is done when we object to the language on the ABC Sunday night movie, or the TV news closeup of a crying mother who has just learned that her child was in an airplane disaster, or the newspaper picture of a victim of an assault? Are there ethical guidelines at the visual input points?

My answer would be yes. Each of us has to make his or her own. For many years now, TV stations, networks, newspapers, magazines, etc. have all been subject to personal reactions, especially when such reaction starts to snowball. Even the most sophisticated mass media do not relish negative public opinion.

The message here? In teaching others to be visually literate, there is perhaps room for giving students a self-awareness of their own value system, and discussion of how that value system fits in with the flood of icons descending upon him or her every day, day in and day out. Results of such introspection may be new forms of media reaction: turn it off, complain, write letters to the editor, cancel subscriptions, work with grass-roots consumer groups and let the abusers know that they can't get away with anything that they happen to think is the proper value system.

Lest anyone think that this sounds like repressive censorship, I mean to make a distinction between simple conveyance of an image and one that transfers a wholly different value system than that of the receiver. I speak of those images that become "objectionable," a notion understandable both in realms of law and ethics.

I would conclude by imploring us to be aware and pass on to those within our circles who are concerned with visual literacy, and to those whom we teach about such literacy, an understanding of essential nature of the place and use of each individual's own value system. I would suggest that if we and our students don't understand the exercise of reasonable self restraints in visual literacy --- from within the domain of the free flow of information under First Amendment rights, --- we certainly will lose our capacity to keep our own private domain, our own value system in a culture where all too often the values seem to be shaped by a few, sometimes offbeat message-shapers in the media.

BIBLIOGRAPHY

Brandeis, Louis and Samuel Warren, "The Right to Privacy" 4 Harvard Law Review 193, (1890).

Buell, Hal, "Suicide Raises Questions Over Use of Photos" AP Log, Feb. 2, 1987, p.1.

Deview, Lucille, "An Aftermath of Restraint, Recklessness" in SPJ/SDX, 1986.

Greene, Bob, "News Business and Right to Privacy Can Be At Odds," in 1985-86 Journalism Ethics Report. Chicago: SPJ/SDX, 1985.

Knight-Ridder advertisement in Columbia Journalism Review, Mar/Apr, 1987, p. 49.

Limburg, Val, "Visual 'Intrusion': A Two-Way Street in Visual Literacy," paper delivered to the Symposium on Verbo Visual Literacy: Research and Theory, University of Stockholm, June 1987.

"Official Kills Self at News Conference" AP Story on Jan. 23, 1987.

Perkes, Dan, Eyewitness to Disaster. N.Y.: Gallery Books, 1985.

Reporters Committee on Freedom of the Press, "Photographers' Guide to Privacy" News Mewdia and the Law, Summer, 1986.

Society of Professional Journalists/SDX Code, 1986.

Towers, Kenneth, "News Value Can Outweigh Distaste of Photographs," 1985-86 Journalism Ethics Report. Chicago: SPJ/SDX, 1985.

Utley, Garrick, "When the Camera Trains Its Lens on the Terrorist," 1985-86 Journalism Ethics Report. Chicago: SPJ/SDX, 1985.

Visual Value

Richard W. Lind

To anyone with any degree of critical taste a Rembrandt is far more valuable--aesthetically speaking--than any Norman Rockwell illustration. Still, the great masses of men would seem to prefer Rockwell to Rembrandt. Asked why, most would confess they 'do not understand' Rembrandt. It seems that understanding and aesthetic value are related. Just how do we make a visual work intelligible, and how would that process determine its worth? Does the person with the ability to understand a work have any grounds for claiming that the work has value *in spite of the inability of others to understand it*? A specialized phenomenological method I have developed, *micro-phenomenology*, offers a plausible solution to these questions.

Put succinctly, micro-phenomenology is the hypothetical reconstruction of the dynamics of the perceptual field. Its goal is to explicate the character of different kinds of experience by analyzing the manner in which the objects of those experiences are addressed by *focal attention*. The link it reveals between vision and evaluation, I want to claim, is a certain kind of attraction of attention to those objects we consider 'aesthetic.' The 'attractiveness' of aesthetic objects, according to this analysis, actually consists in the heightened degree of attention required to make them intelligible. Attentional attraction also just happens to be the basis for attributing value to an object, I hold. That is, the degree of attraction a thing exerts determines the degree of (positive) value we attribute to it. Hence, the more attractive we find a thing visually, the more value it has as an aesthetic object. Micro-phenomenological analyses of aesthetic objects and of value have already been separately reported in previous articles.[1] This essay will concentrate on the link between them.

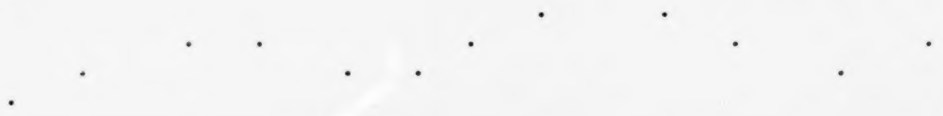
I

First, let me explain a little more precisely what micro-phenomenology is. Unlike modern cognitive psychology, which explains psychological events in terms of abstract flow charts divorced from any actual experience, micro-phenomenology explicates them in terms of the immediate field of experience, the phenomenal field.[2] It is thus an 'introspective' or reflective discipline, more like Gestalt psychology. But it differs from Gestalt theory in its exclusive analysis of the role of discriminating attention in the constitution of the objects of perception. It analyzes these phenomena in terms of the way in which focal attention brings them out as 'figures' against the

BEST COPY AVAILABLE

background of experience. Focal attention must be thought of as the process of articulating the objects and relations appearing in the phenomenal field. Visual objects, for instance, are not instantly apparent to us but must undergo a process of 'development'--albeit a subliminally swift process--wherein the objects are delineated. This process is most apparent when the object is considerably complicated. The whole of a Rembrandt, for instance, is not immediately obvious. It takes a considerable amount of time before all of it is readily apparent.

In my various articles on aesthetic phenomena I have argued that visual discrimination proceeds according to certain principles of attention.[3] The direction in which the focus proceeds in the elucidation of the the data is governed primarily by the principle of *similarity*. According to the principle of similarity, attention tends to oscillate among similar elements in the visual field. As Gestalt psychologists have established, similar elements tend to hang together as a 'whole.' These wholes, I have argued actually consist of the *scan paths* of attentional focus. I have supported this claim with experiments which show that different structures emerge according to the manner in which attention addresses the data. For instance, slow and deliberate attention to an irregular array of similar dots produces rectilinear connections among them, whereas a swift scan of them yields a single curvilinear figure, as reflection on the figure below will demonstrate. One function of discriminating attention, then, is that it serves to weave the data of experience into phenomenal wholes.



A second and more important function of attention is that it makes us distinctly aware of the visual relations among the elements of the field.[4] When attention moves about in the field, it carries with it the image of whatever it previously focused, I hold. For instance, if attention moves from one circle to a nearby circle, one is immediately aware of the similarity or differences between those circles. That is because attention *superimposes* the one image on the other in an act of automatic *comparison*. In the same way, we can see that one line is about twice the length of another because we can see that the image of the smaller one fits twice into that of the larger. That 'fit' can only be accomplished by the focal superimposition of the image. I have tried to show that this hypothesis accounts for certain so-called 'optical illusions' that cannot otherwise be explained.[5] If the theory is true, it follows that the function of discriminating attention is thus to make the objects of perception internally *intelligible*. We 'understand' a visual object only when we have been able to bring out its internal relations through discrimination. Conversely, we fail to understand a work if for some reason our focal comparisons fail to find any proportions or congruences within it.

An aesthetic visual object, according to the theory, differs from an ordinary visual object only by the degree of visual discrimination it elicits. Paradoxically, to be aesthetic, an object must be difficult to discriminate. Objects easily discriminated are boring; they do not hold our attention. An aesthetic object is an object that fascinates us. That fascination is nothing more than heightened, sustained discrimination perpetuated by the very difficulty in making the object fully intelligible. So it is no accident that artists must employ devices such as complexity, ambiguity or subtlety to sustain interest in their works. These features prolong and heighten the process of discriminating the work, making it aesthetic.

But it is important to understand that focal discrimination, though automatically governed by the principles of similarity, is subject to a certain amount of voluntary and habitual control as well. Where one starts looking and what one looks for seem to be learned factors of attention. It follows that focal discrimination can become a matter of *skill* to a considerable extent. Thus, what is aesthetic to one person may not be aesthetic to another, depending on one's discriminatory skill. Individuals possessing aesthetic 'taste' would appear to be individuals who have acquired the appropriate skills necessary for becoming fascinated with works of considerable complexity, ambiguity or subtlety. They have become, as the (rather elitist) saying goes, 'discriminating' individuals. Since your ordinary man-or-woman-on-the-street has adequate skills to address a Rockwell but not enough for a Rembrandt, it is not surprising that they 'understand' the former far better than they do the latter, which holds no fascination for them because they do not know where or how they should begin to analyze it visually.

Individuals able to understand a Rembrandt consistently attribute more value to it than to any Rockwell. The foregoing analysis would tend to indicate that they rate Rembrandt's work higher than Rockwell's because they find it more fascinating. But does the value of a work hinge on visual fascination? Should we accept the judgment of the keenly discriminating person over that of the ordinary viewer? A micro-phenomenology of value may help us to to understand the connection between discrimination and value.

II

How do we tell we have something of value before us? What are the criteria by which we determine if something is good or bad? Those have been the central questions in value theory since its inception, but every theory that has dealt with these questions has met with serious criticism. It is not unreasonable to assume that if there is any way to tell a 'good' item from a 'bad' one, it is by 'reading off' certain factors in the experience. That is, there must be certain experiential *criteria* for recognizing the value of a thing. If there are such criteria, they are not readily evident. It may be possible, however, to develop a micro-phenomenological account of such conditions in terms of the dynamics of focal attention.

In a lengthy article on the subject I have argued that our judgments of value are keyed by a pair of focal principles I call 'motive attraction' and 'motive repulsion.'[6] Virtually everyone familiar with the English language knows what it means to say that one is 'attracted' to some possibility or 'repelled' by another. But most people would be hard pressed to specify *exactly* what they mean by these terms. On the basis of micro-phenomenological analysis, I have concluded that the phenomena we recognize as attraction and repulsion are attentional mechanisms that lie at the heart of the body's motivational system. That is, certain sorts of attentional attraction and repulsion seem to have the capacity to trigger all of the physiological responses associated with motivation.

To say that anyone is motively attracted to anything is to say that their perceptual or imaginative processes are characterized by a tendency to elaborate and maintain in consciousness the stimulus whose presence has elicited this discriminating activity. The more pronounced the attraction, the more fully conscious one becomes of the object or at least the possibility of attaining it. This heightened attentional activity gives rise to the heightening of certain kinesthetic and visceral activity, which are the body's way of preparing for action on behalf of the attractive possibility. Hence, the greater the attraction the greater the attendant feeling sensations from the musculature and viscera. These feelings we call 'pleasure.' Motive repulsion is the opposing tendency to withdraw attention as completely as possible from a stimulus. The accompanying repellent feelings are called 'displeasure' or 'pain.' It is important to note, however, that at the lower levels of intensity motive attraction and repulsion do not give rise to noticeable bodily changes and are therefore not accompanied by pleasure or pain. On such occasions we are able to make 'cool' evaluations, devoid of feeling.

How do we acquire the particular attractions and repulsions that motivate us to action? It would seem that we come into the world with certain basic attractions, such as the attraction to certain food, to warmth, to being gently touched, to sexual stimulation and so on. Certain repulsions to loud noises, strong tactile, kinesthetic or visceral sensations, bitter tastes, etc., also seem to be innate. But most of our attractions and repulsions are 'learned' through a complicated network of associations with the few basic attractions and repulsions with which we are born, including the aforementioned attraction to visual intelligibility. Most of our attractions and repulsions, that is, have been 'conditioned.' But whether innate or conditioned, it is the relative attractiveness or repellency of alternative courses of action that enables us to make choices. To judge the attractiveness or repulsiveness of pragmatic possibilities is, I claim, to judge the *value* of those possibilities.

So my thesis is that the main criteria by which we judge the values of things are the relative motive attractiveness or repulsiveness of the items under consideration. If for instance, one's choices for an evening are either to go for a walk or stay home and read a book, how else do we decide which is the *better* choice than to intuit which one has the greater attraction in the comparison? What we assess is the attractiveness or repulsiveness of *pragmatic* possibilities when we make a value judgment. To put it crudely for now, something is 'good,' according to this analysis, if it is motively attractive or 'bad' if motively repellent in some pragmatic context. By 'pragmatic context' I mean any practical context in which a choice is being considered.

It is crucial to add the qualification that the attraction or repulsion be related to a pragmatic context because *values vary according to the context in which they are considered*. A choice may be attractive in one context but repellent in another, and our evaluation of it varies accordingly. Promiscuous sex in the Age of Aids comes to mind as a lively example: It may appear attractive in a very short-range context, but it is definitely repellent when considered in the broad context of possible consequences. So things can be good in one sense and bad in another sense. Hence it is important to distinguish all the different ways in which these senses can vary. Indeed there seem to five different dimensions in any given pragmatic context which will determine whether we find something 'good' or 'bad':

1) *Mode*. There are different kinds of end in view, including the *ethical*, the *egoistic*, the *religious*, the *theoretical* and, of course, the *aesthetic*, according to which something can be attractive or repellent. Since the same thing can be attractive in one mode and repellent in another, the mode *must* determine whether it is good or bad.

Uncle Tom's Cabin, for instance, could thus be said to be *morally* good but *aesthetically* bad.

2) *Means-end status*. Some things are attractive only as a means to something else. Money has value only because we associate it with what we can buy with it, for instance. But if money lost all buying power it would lose its attraction, since it is not attractive in itself. Sex, on the other hand, has attraction in and of itself, but as a means to anything it is attractive to us only if its consequences are also attractive. Hence the value of anything depends on the means-end status being considered.

3) *Range*. Something attractive in the long run is not necessarily so in the short run, or vice versa. For example, one might find travel attractive as a vacation option but not as a retirement lifestyle.

4) *Basis of comparison*. What we compare a thing to obviously determines whether we find it attractive, hence good. Compared to other subcompact cars, a Toyota Corolla may seem quite good, but it "pales in comparison" with a Mercedes.

5) *Scope of Community*. When we judge an item good, we may have only its attractiveness to ourselves in mind or we may be thinking that it is or should be attractive to everyone. Or we might be contemplating some limited community between these extremes. Flexibility of judgment in this dimension accounts for the fact that some judgments are manifestly relative ("I know you don't like artichokes, but I find them good") while others are plainly universal ("Forcing women to wear veils is a morally bad practice, whatever the Arabs believe.") But sometimes we mean something in between, as when anyone says, "This is good liver--to anyone who likes liver."

In sum, *something is judged good only if it is judged to be motively attractive in some pragmatic context specifiable in terms of each of the five variables listed above*. It is always intuitively legitimate, when someone calls anything "good," to demand clarification in all five dimensions in order to determine in just what sense it is good. And the *sense*, that is, the pragmatic context, in which one considers something will always enter into the question of whether one finds it good or not.

III

In the first section of this essay I tried to show that what makes an object aesthetic is what I have called it's motive attractiveness, resulting from certain principles of perception that motivate attention to discriminate objects in order to make them intelligible. In the second section I argued that what makes an object good is its motive attractiveness in some specific pragmatic context subject to the above-mentioned five conditions. In this last section I shall try to show how our aesthetic analysis and our value analysis come together to explicate the concept of visual value and, more generally, aesthetic value.

The first thing to point out is that works of art, by the very way that they are visually organized, are able to elicit motive attraction. The heightened, sustained discrimination by which we try to make the work intelligible is a form of motive attraction. It gives rise to kinesthetic and visceral activity which we feel as pleasure. It motivates us to continue to scan the work--indeed, even to go out of our way to repeat such experiences by going to art shows, movies, ballets, etc. That does not mean that we are *evaluating* a work when we are *enjoying* it. Remember--we must consider the object as a practical choice to evaluate it. The aesthetic experience is in fact an *nonpractical* experience, as every aesthetician will agree. Hence, we use terms like 'beautiful' and 'ugly' to describe our attraction or repulsion during the experience. It is only when we 'step back' into the practical world and ask ourselves whether we should be taking the time to view such works that questions of 'good' and 'bad' come up.

According to our theory, when we do step back to evaluate a work, the pragmatic context in which we place it is going to make a difference in the value we attribute to it. Let's consider how the five dimensions of the pragmatic context can account for different kinds of aesthetic values:

(1) *Mode*. When a work is judged for its aesthetic value, its mere visual attraction is the only factor considered. How attractive as a possible choice is the visual experience of the object. But one can judge art works art on moral, religious or other bases as well, and their value can radically change. In fact it is possible to confuse these different modes, as when one condemns a pornographic work on moral grounds and overlooks the fact that it is attractive aesthetically.

(2) *Instrumental/intrinsic*. To be judged aesthetically a work must be considered solely for the experience one has with it, intrinsically, not for anything the work might be a means to. Anyone who judges a work for what it is worth in dollars, for instance, is not making an aesthetic judgment because he is treating it as a means to something else--what it will fetch on the open market.

(3) *Temporal range*. How much of the future we consider when we judge a work of art can have considerable affect on the value we attribute to it. Many works seem less attractive as a choice for future contemplation when we

consider their 'staying power'; we know that we will tire of them. But the time period we have in mind when we judge any given work need not be the so-called 'test of time.' It might be fair only to judge certain short-lived works such as 'happenings,' self-destructive sculptures and musical improvisations over the short run.

(4) *Basis of comparison*. Works that may seem quite good when judged by themselves can, as we say, 'pale in comparison.' What we compare a work to will make a difference in the evaluation. The work of an amateur may be judged positively when compared to that of other amateurs, but could be found 'pretty bad' when held up to the work of certain masters. Many of the differences of opinion about the value of specific works could very well be dispelled by a clarification of the different bases of comparison being used.

(5) *Scope of community*. Even when it comes to art, the scope of our judgment can be limited to our own response or it can be expanded to include everyone's. Significantly, it is also possible to have a particular 'community of taste' in mind, a certain class of people who would find the item in question attractive. Though many people make them, universal judgments of aesthetic value are bound to be false; there isn't a single work that someone will not like. On the other hand, judgments that announce what simply what the speaker finds attractive are not very interesting. The most useful aesthetic judgments, then, would be those that announce what would be attractive to a certain community of taste. Useful because once we find a critic whose taste agrees with out own, his or her judgments will help us decide how to spend our art-viewing hours.

According to the foregoing analysis, then, the goodness or badness of any work of art depends on the specific context the evaluator has in mind when making the judgment, variable in five dimensions. We can now return to our initial question: Who is right--the ordinary viewer who judges Rockwell to be better than Rembrandt or the art sophisticate who believes just the reverse? If our analysis is correct, they could both be right, both be wrong or one could be right and the other wrong, *depending on the specific contexts they had in mind*. If both the ordinary and the discriminating viewer meant to include *only themselves* in the scope of community, then the first would be right to say that Rockwell is better and the second would be also right in identifying the Rembrandt as better--insignificantly right, however, because each would be merely stating his own personal preference. But if either meant to state a universal judgment, it would clearly be false, because of differences in taste. People who make such bold judgments are simply trying to erect their own taste into some kind of universal law. The most significant value judgment an individual can make and still be right is that the work in question is better *to the community of taste to which that individual happens to belong*--everyone who has the same or similar taste. In this sense both the novice and the sophisticate could be right in their respective judgments because each would have reference to a different community of taste. There is no logical contradiction between the following:

> 'X is better to my group,' says A.
> 'Y is better to my group,' says B.

But must our evaluations always be relative in this way? Doesn't the discriminating viewer have some sort of advantage over the less perceptive viewer? I should like to suggest that there is a *more precise* sense in which the discriminating viewer can include the ordinary viewer in his evaluation, if he carefully qualifies his judgment. What one *could* mean when one says that Rembrandt's works are 'good'--even great--is that they will be found aesthetically attractive *by any normal person who will take the time to develop their visual sensitivity*. Here the community of taste is expanded to include those with the *potential* to appreciate Rembrandt even if they have not yet taken the interest and exercised the patience to learn to perform the necessary discriminations.

This particular sense of aesthetic value, I submit, is the sense that art teachers and critics alike should, if they don't already, have in mind when they tell their students and readers that Rembrandt and other masters are better than Rockwell. Such judgments may still be false--it all depends on whether viewers with ordinary perceptual powers can in fact eventually come to appreciate the complexity, subtlety and ambiguity of a Rembrandt. Experience leads me to believe they can. In any event, the sense of value in question would seem to be the most informative and useful sense in which to evaluate works of art, if only because it challenges the ordinary viewer to discover a source of considerable attraction and enjoyment that would otherwise have been missed. For such a meaning to be clear to one's hearers, however, it must be fully spelled out. The listener should know that it is his own potential to which the teacher or critic is appealing. Otherwise the claim that Rembrandt is better than Rockwell may strike him as either false or elitist.

Notes

1. "Attention and the Aesthetic Object," *Journal of Aesthetics and Art Criticism*, XXXIX, No. 1, Winter 1980, pp. 131-142; "A Microphenomenology of Aesthetic Qualities," *Journal of Aesthetics and Art Criticism*, XLIII/4, Summer 1985, pp. 393-403; "Why Isn't Minimal Art Boring?", *Journal of Aesthetics and Art Criticism*, Fall 1986, pp. 195-197;"Towards a Phenomenological Metaethics," *Philosophy Research Archives*, Vol. IX, 1983, pp. 639-663.
2. For a more detailed explication of micro-phenomenology as a method see my "Is Phenomenology Testable," *Southwest Philosophical Studies*, Vol. 8, No. 1, October 1982, pp. 85-94.
3. See esp. "Attention and the Aesthetic Object," pp. 132 ff.
4. Ibid., p. 137.
5. "A Microphenomenology of Aesthetic Qualities," pp. 396,7.
6. "Towards a Phenomenological Metaethics," p. 643 ff.